ICE and REFRIGERATION

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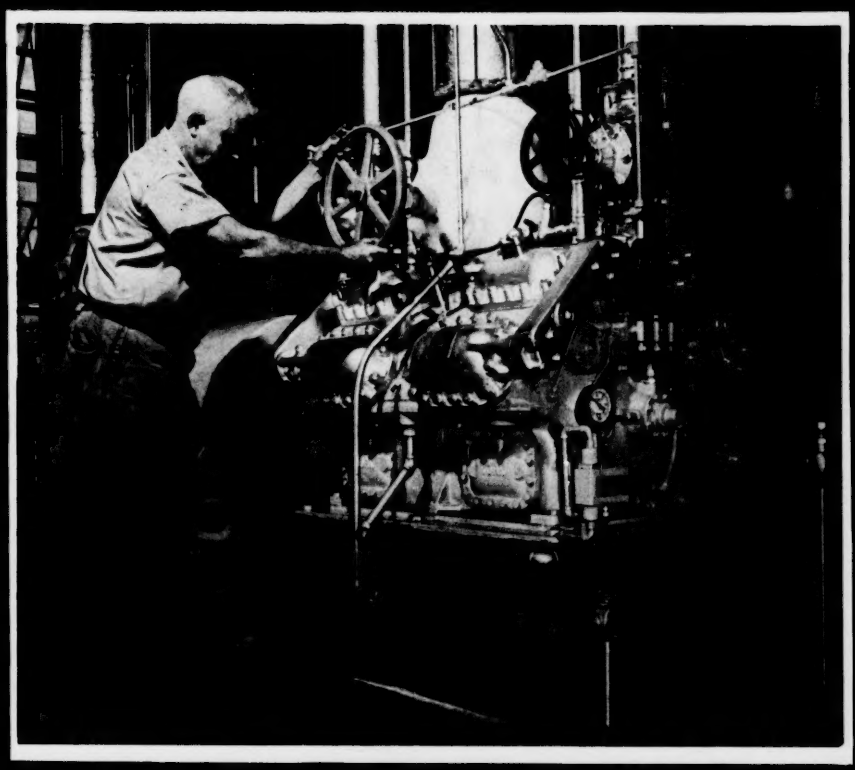


1952 Ice Prices Show Small Increases . . . . . Page 13

MAY • 1952

New Merchandise Provides Space for Concentrate . . . . Page 21

ARE YOU COMPRESSING FOR COLD OR ULTRA COLD?..

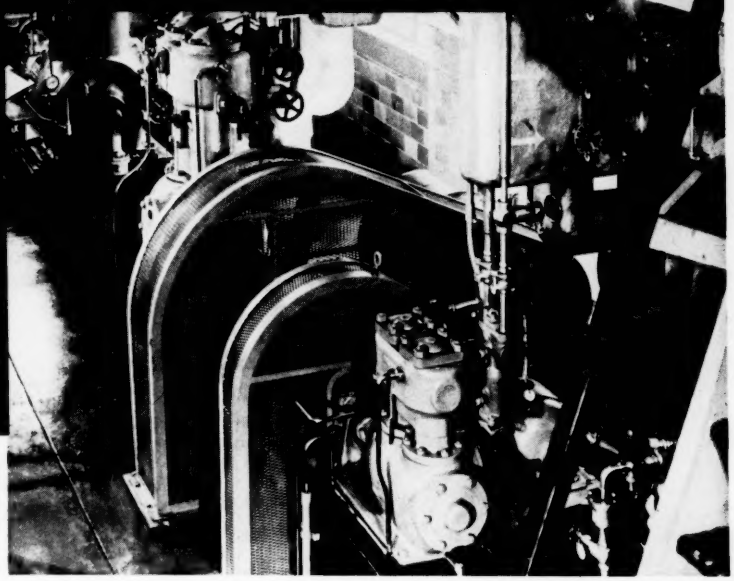


Photo Courtesy York Corporation

New and improved *Texaco Capella Oil (Waxfree)* assures complete freedom from wax precipitation *even down to minus 100° F.* Thus, whether you're compressing for just normal refrigeration, or need ultra-low temperatures for special work, you'll assure high efficiency and clean compressor operation with *Texaco Capella Oil (Waxfree).*

Severe tests show the low haze and floc temperatures of *Texaco Capella Oil (Waxfree)* to be unexcelled. That is true, also, of its high purity, stability and resistance to oxidation. *Texaco Capella Oil (Waxfree)* has a very low pour test, is moisture-free, does not react with refrigerants and does not foam.

Whatever the type or age of your compressors or their operating conditions, there is a *Texaco Capella Oil (Waxfree)* to assure maximum efficiency with minimum maintenance costs. *Texaco Capella Oils (Waxfree)* come in refinery-sealed 55-gallon drums; and 5-gallon, 1-gallon and 1-quart cans for make-up. Let a Texaco Lubrication Engineer help you select the proper one to assure best results from your compressors.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Capella Oils (Waxfree)

FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

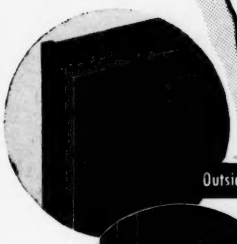
new "X-TYPE" doors

MOST REVOLUTIONARY ADVANCEMENT IN THE COLD STORAGE DOOR INDUSTRY!

Advantages of "Butcher Boy" NEW "X-TYPE" Construction:

1. "X-Type" Steel Diagonal Bracing is the basic principal of RIGIDITY.
2. Guarantees MAXIMUM INSULATION FILL inside of door.
3. The only POSITIVE method to prevent door sagging.
4. Allows REVERSAL OF DOOR SWING if necessary.

The Strongest and Most Durable Cold Storage Door Built!



Outside Corner Construction

Inside Corner Construction

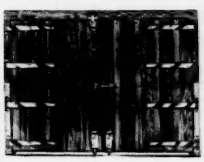
"INTERLOK" NO-SAG CORNER CONSTRUCTION *(Pat. Pend.)*

No other cold storage door company can offer the exclusive features of "X-Type" Steel Bracing and "Interlok" No-Sag door construction . . . Specify these features . . . They cost no more.

ALL BUTCHER BOY DOORS ARE BUILT "X-TYPE"

Plywood Door

Track Door



Double Door

Vestibule Door

Low Temp. Door

BUTCHER BOY COLD STORAGE DOOR CO.
170-180 N. SANGAMON ST. ★ CHICAGO 7, ILL. U. S. A.

Write Today for New Catalog

Butcher Boy Cold Storage Door Co.
170 N. Sangamon St., Chicago 7, Ill.

Please send me your new catalog on Butcher Boy "X-Type" doors

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Address_____

City_____ State_____

IT TAKES ONLY ONE
to install pipe

but FIVE
to repai

One of the most convincing demonstrations on the economy of using *durable* material is a repair job where low-first-cost material has failed—and is being replaced.

The original installation had been quickly made by pipe fitters. But the replacement calls for hours of work by as many as five crafts: pipe fitter, mason, plasterer, carpenter, painter. And this is only part of the cost story. The loss in production or utilization during the shut-down may amount to far more than the maintenance charge.

True, you pay a little more to *begin* with for Byers Wrought Iron pipe . . . but you pay a lot less to *end* with. In literally thousands of applications where corrosion costs you more than wrought iron, the use of this material is the soundest kind of economy move.

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This notch-fracture test specimen illustrates the unusual fibrous structure of wrought iron—which is responsible for the unusual corrosion resistance of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

You will find a lot of helpful information on the control of excessive maintenance through the use of Byers Wrought Iron pipe in our technical bulletin, WROUGHT IRON FOR PIPING SYSTEMS. We will be glad to send you a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco, Export Division: New York, New York.

BYERS

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WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

ICE and Refrigeration

VOLUME 122 NUMBER 5

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May, 1952

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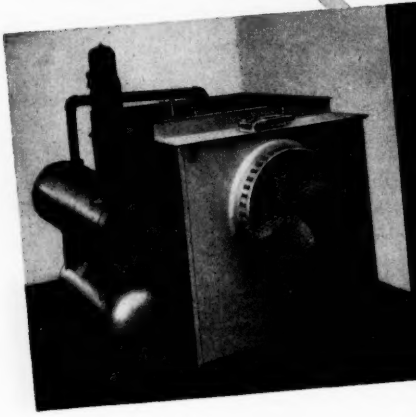
New

SAVES WATER and CUTS MAINTENANCE COSTS . . .

Illustration shows two views of a 55 ton Condenser Tower prior to partial disassembly for shipment.



Vogt

CONDENSER TOWER

FOR CONDENSING REFRIGERANTS

SINGLE RESPONSIBILITY:

Vogt, leading builder of refrigeration condensers, assumes responsibility for engineering the unit. Only one purchase order needed.

SHOP FITTED:

To cut down field assembly labor. Requires no cutting or fitting of pipe.

Designed for today's water conservation requirements, and to keep refrigeration costs low, the *new* Vogt Condenser Tower meets the need for a proven, readily cleanable condensing unit.

The Vogt Condenser Tower consists of a multipass straight tube condenser, a receiver, an oil trap, a cooling tower, and a water pump. Removable cast iron heads permit easy cleaning of the condenser tubes.

Water costs are extremely low since the cooling water is recirculated continuously and requires only a small amount of makeup to replace losses due to windage and evaporation.

Condenser Tower units are available in capacities ranging from 5 to 50 tons refrigeration. Additional information will be furnished upon request.

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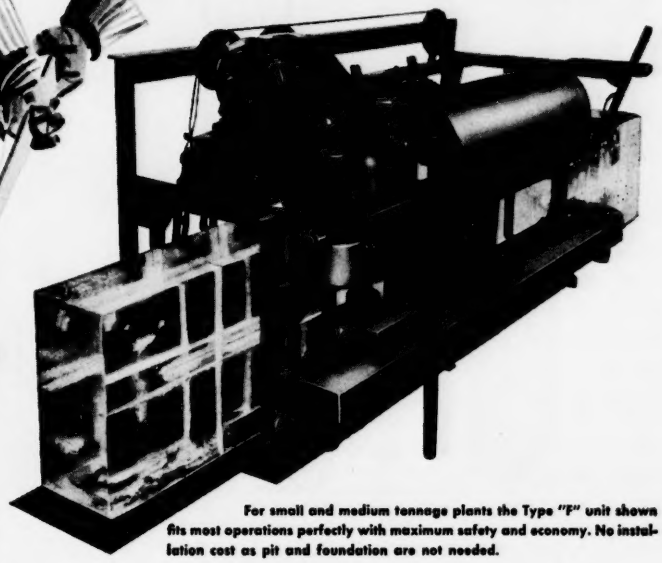
BRANCH OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS, CHARLESTON, W. VA.

Tops in ice scoring...



For small and medium tonnage plants the Type "F" unit shown fits most operations perfectly with maximum safety and economy. No installation cost as pit and foundation are not needed.

GIFFORD-WOOD TYPE "F" SCORING MACHINE

G-W ICE TOOLS

A complete line of top-quality hand-tools . . . tongs, hooks, shavers, bars, chisels, etc. . . . designed to make manual handling of ice easy and safe—made tough to stand the gaff of years. Write for Bulletin No. 480.

"Our Type 'F' Scorer has been in constant use for nearly 14 years and has... given the best service of any piece of equipment we have bought since we started in business in 1906."

We think this statement from one user speaks volumes for the quality of the Gifford-Wood Type "F" Scoring Machine. It is a rugged unit, precision-built to do a clean, even scoring job over many years—with a minimum of maintenance.

One-man operation of a G-W Type "F" Scorer delivers three or more 300- or 400-lb. cakes per minute—either in the storage room or on the platform. Completely portable, no hold-down bolts needed.

For full information on other types of ice scorers manufactured by Gifford-Wood, write for Bulletin 116A.

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Cuber Breaker-Elevator Conveyor Breaker

ALCO T Series

the "Scotch" valves—save you time two ways

EASY TO SERVICE ON THE LINE—remove two cap screws; lift off power assembly; take out the cage assembly. Now you're ready to inspect and clean the valve or replace parts.

EXTERNAL SUPERHEAT ADJUSTMENT—just remove seal cap on side of the valve and turn adjusting stem. It's that simple!

Available with internal or external equalizer. Capacity from 1/2 to 50 tons "F-12". There is a T-Series Valve for all temperatures and all refrigerants.

For further details, send for Bulletin 171.

SEE YOUR ALCO WHOLESALER!

ALCO VALVE CO.

835 KINGSLAND AVE. • ST. LOUIS 5, MO.

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

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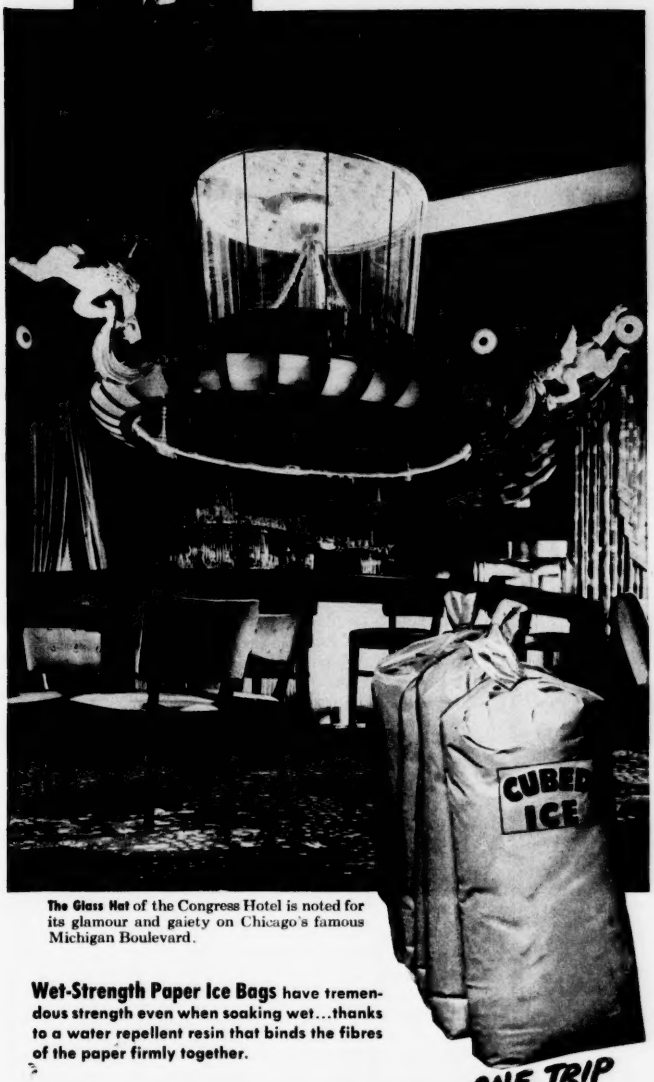
"For a fine hotel, Packaged Processed Ice is a sanitary necessity"

says Nino Bignami, Director Food & Beverage, Congress Hotel, Chicago Illinois



The Glass Hat of the Congress Hotel is noted for its glamour and gaiety on Chicago's famous Michigan Boulevard.

Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet...thanks to a water repellent resin that binds the fibres of the paper firmly together.

The Extra Service That Makes the Sale

SMART BARS and eating places can't take chances with processed ice. It must be 100% free of contamination, dirt, foreign particles. That's why so many of them today insist on processed ice packaged in Union Paper Ice Bags. The wire tie locks out dirt, bars spillage or pilferage.

The Union one-trip Paper Ice Bag cuts your costs, too. The sturdy wet-strength paper—two layers thick—retards melting. Handling is speeded up—at the ice processor, loading dock, delivery point.

You'll find, too, that customers use more ice; it is so easy for them to ice from the handy paper bag.

Month after month more ice companies build new business with the Union Paper Ice Bag. Join the parade. Write for free samples today.

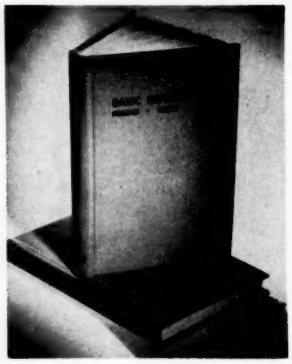
ONE TRIP

TRADE MARK UNION

UNION Paper Ice Bags

A product of the UNION BAG & PAPER CORPORATION • 233 Broadway, New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates



The Book of "Refrigeration Knowledge"

Basic Refrigeration is designed to give a good working knowledge of modern refrigeration principles, equipment and its operation. Beginning with the fundamentals and generally understood materials, it progresses through basic details of equipment to application, operation and servicing of systems.

BASIC REFRIGERATION

PRINCIPLES • PRACTICE • OPERATION

By Guy R. King

29 Chapters—340 ILLUSTRATIONS—526 PAGES COVERING THESE SUBJECTS

- Fundamentals
- Compression System of Refrigeration
- Refrigerants
- Expansion Valves
- Evaporators
- Compressors
- Condensers
- Flow Equipment
- Electric Controls and Control Valves
- Lubrication
- Defrosting Methods
- Compressor Drives
- Food Preservation
- Operating
- Servicing
- Refrigerated Enclosures
- Instruments and Meters
- Heat Calculations
- Humidity in Refrigeration
- Compressor Calculations I
- Compressor Calculations II
- Refrigerant Lines—Pressure Drops
- Brine in Refrigeration
- Liquid Cooling
- Complete Systems
- Carbon Dioxide—Dry Ice
- Altitude and Its Effect
- Absorption Systems
- The Refrigeration Code

Different refrigerants and the various sizes of equipment are all given equal treatment. There are no complicated formulae or mathematics in the book. It develops the subject in logical step-by-step method with clear explanation of all factors.

Special drawings supplement the material in the text and explain basic factors. Of some 340 illustrations, the majority are special drawings which detail fundamental points in an easily understood fashion. Frequent examples are worked out in the text to show step by step solutions.

How automatic controls operate and what they do in the system are explained in simple terms. Parts and their functions are shown. This important field, in present-day refrigeration, is covered in a fashion that tells how to use controls and keep them operating to good advantage.

Send for this Book—$6.00

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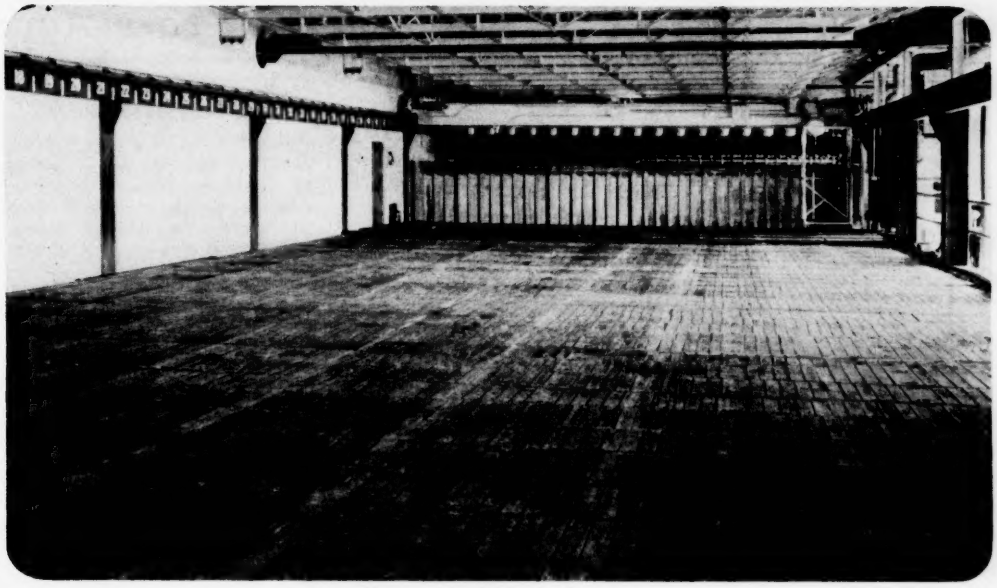

FRICK

Genuine Oak Ice-Can Covers, Boiled in Linseed Oil

Standard Frick Covers are Made for One or Two Cans

Using selected, seasoned wood, these covers are made with the right spacing between boards to keep them flat in service. Waterproof tar paper is between the layers, which are secured with drive screws; lifting eyes are made oversize. Furnished for one, two, three or four cans. None better. Get yours now, whether needed for a new plant or for replacements.

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DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

MONEY-SAVING CP Equipment

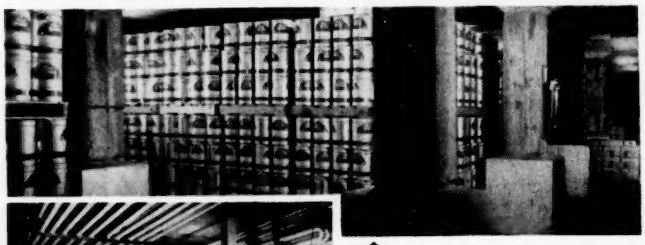
for FROZEN FOOD PROCESSORS

It pays to consult Creamery Package when refrigeration equipment for a frozen food plant is considered. CP's complete line includes compressors, condensers and other equipment . . . also heat exchangers, etc. for those who process fruit and vegetable juices. *Let* CP *engineers help you to plan.*

CP MULTI-CYLINDER BOOSTER
One of many units in complete CP Line of refrigeration equipment which includes ammonia compressors and boosters.

CP MULTI-PASS PLATE HEAT EXCHANGER
Provides continuous flow—no lag or surge of product—in cooling juices for processing. Smaller stainless steel plate assures fast heat exchange.

CP MULTI-FLO HOMOGENIZER
Operates with less pressure and horsepower to reduce load and wear. Unique CP *single-service* valve gives more uniform results. Lowest power costs and minimum clean-up time.



Storage room of Cherry Growers, Inc., 709 E. Front St., Traverse City, Mich.

Freezer room (–10°F.) contains 12,000 feet of 2" flooded ammonia piping.

We are proud that CP Refrigeration has long been the choice for the big plant of Cherry Growers, Inc., Traverse City, Mich.

CP Refrigeration Machinery—two generations: 2 10¼x21 horizontal ammonia compressors (1 Diesel, 1 motor-driven); and 9x9 ammonia compressor with Diesel, also have 2—10x10 ammonia compressors with 125 h.p. Buda Diesels.

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60 Years Ago

From the May, 1892 issue of ICE AND REFRIGERATION

THE FLORIDA Ice Manufacturers Association held their annual meeting March 16. The shipment of ice by members into the territory of other factories and the protection of each other against a certain class of customers was discussed and a resolution was adopted that a factory could ship ice into another's territory provided the regular association price was charged, but a factory must not encourage or solicit trade beyond its own territory.

A CINCINNATI newspaper reports that a "pool" of ice dealers has broken up, following a disagreement with the artificial and natural ice men owing to failure to agree on a joint schedule. The natural ice men signed a schedule of prices pledging each other to be governed by it for the present and the coming season. But the artificial ice companies positively declined to enter into any such agreement and, it was stated, inaugurated a war of prices. There were five ice factories whose daily production was 325 tons.

AN EDITORIAL comments that the carrying of eggs in cold storage in 1891 did not seem to have been particularly successful in Chicago from a pecuniary point of view. Such eggs at the commencement of the year were 16 to 19 cents a dozen and were fairly well closed out at around 15 to 17 cents. They started in that season at about 16 cents and ruled steady for some time at 18 to 19 cents but the mild weather in December caused a break to 16 to 17 cents. Unless eggs, therefore, can be bought at 10 or 11 cents, there is but little money in them. One is inclined to think, however, that there is more or less prejudice against "cooler" eggs.

ICE PRICES for 1892, a forerunner of the annual feature which has appeared in every May issue of ICE AND REFRIGERATION, shows current prices obtaining in many cities. Wholesale prices per ton (delivered) were $2.00 to $3.00. "Family rates" are quoted at 57 cents to $1.60 per week for 25 to 30 pounds daily, with corresponding prices for lesser amounts. "Pound rates" were 20 to 40 cents per cwt for 100 to 300 pounds. In those days, too, there were some discouraged ice men like the one who wrote, "We are continuing in the ice business just to wear out our old clothes and not for our health for we are always healthy and hungry."

In The Spotlight

ICE PRICES for 1952 again show a slight increase over those established for 1951, according to the annual survey starting on page 13. The grand average price of all ice will be $9.49 per ton, compared to $9.08 in 1951. Prices are shown from 320 distributors located in 48 states and 297 cities throughout the United States and Canada.

THE CONCENTRATE industry in Florida has expanded to such an extent that enlarged refrigerated storage space has become a necessity. A part of this needed space has been provided by the new million dollar plant of Central Florida Refrigerated Warehouses at Plymouth. For illustrated description of this plant see page 21.

TRADE PRACTICE RULES for the public refrigerated storage industry as revised, have been promulgated by the Federal Trade Commission, effective April 4, 1952. The full text of the final draft is published on page 23.

THE WOODEN PALLET has come to be an essential piece of warehousing equipment. By experience, warehousemen have learned that there is a difference between good pallets and bad ones. A committee of the American Warehousemen's Association has made a study of their purchase, care and maintenance, report of which is published, starting on page 27.

HOLDINGS of cold storage commodities on March 31 utilized 59 percent of available cooler space as compared with 60 percent last year and an average of 56 percent. Freezer occupancy was five points above average and a year ago. For full details see monthly report on page 29.

COVER: One of the four York high speed v/w ammonia compressors, in plant of Central Florida Refrigerated Warehouse, three of which maintain constant, year-round subzero temperature, and the fourth used as a stand-by for an emergency. Chief Engineer Ross Barnett opens the main ammonia valve. Story on page. 23.

AN INSULATING concrete, light weight and having other advantages, is finding favor with builders of new construction with low temperature rooms. Description of its structural and insulating qualities, with pictures, is given in the article on page 33.

MANY COMMODITIES, aside from perishable foods, may be kept in refrigerated storage to help maintain their freshness and quality. A review of this subject is presented in the article on page 34.

A LEGAL OPINION on the current status of the Orrison reissue patent on sized ice has been written for the National Association of Ice Industries by a Washington patent attorney. He states that in his opinion the reissue claims are invalid. A summary of this opinion and report on the current status of the patent are given in the article on page 36.

AN ICE CUBE vending machine, operated in conjunction with a drive-up beverage department with a reach-in cooler has resulted in a profitable investment for a Kroger grocery store in Toledo, Ohio. For story and pictures see page 39.

A FABULOUS ICE PALACE, built entirely of blocks of ice in Leadville, Colorado in the late nineties, cost $140,000 and lasted four months. For story and picture see page 44.

Because of the fact that this May issue of ICE AND REFRIGERATION did not reach readers until after the opening of annual conventions of the American Warehousemen's Association, the National Association of Refrigerated Warehouses, and The Refrigeration Research Foundation, information regarding the programs of these meetings is not included in this issue. The June number will have a full report of all three conventions.

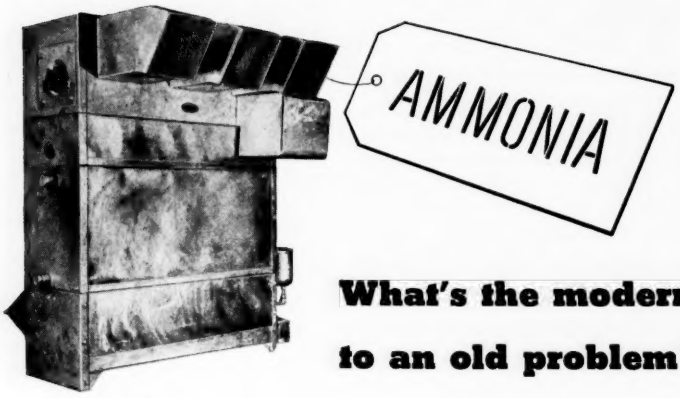
DETAILS of engineering problems involved in estimating air conditioning loads and the factors to be used in some rapid estimates of the air conditioning requirements are discussed by an air conditioning engineer in the article starting on page 45.

THE EFFECT of temperature and storage on quality of frozen citrus concentrates was presented in a paper at the frozen foods convention by a representative of the Minute Maid Corp., Plymouth, Fla. It is summarized on page 52.

THE AMERICAN SOCIETY of Refrigerating Engineers announces an interesting program of informal and technical discussions at the annual Spring Meeting to be held at Atlanta, Ga. June 1-4. A preview of the program is given on page 55.

BOOK REVIEWS of interest to the refrigerating industries, page 56, include a new Heating, Ventilating and Air Conditioning Guide, Marine Air Conditioning and Refrigeration, and an illustrated Thesaurus for Engineers.

A SAVING of $440,000 a year was made in shipping western-grown vegetables as a result of research which reduced the quantity of ice used to preserve the products on their way to eastern markets.



CARRIER AMMONIA
EVAPORATIVE CONDENSER

What's the modern solution to an old problem?

If you need refrigeration in a city or any other place where water is a problem, you'll be interested in the new Carrier line of Ammonia Evaporative Condensers.

Used in place of water-cooled condensers, they save as much as 95% water and 15% power costs. And because they require much less pumping head than cooling towers, you save from 75% to 90% in pumping costs, too.

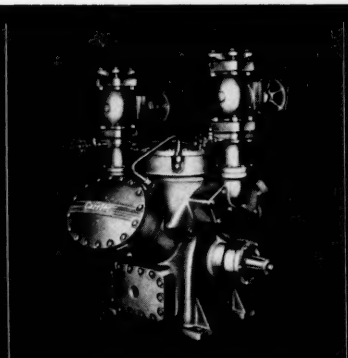
Hot dip galvanized after fabrication, they go indoors or outdoors. Sectionalized for easy installation, they offer a wide variety of applications and locations.

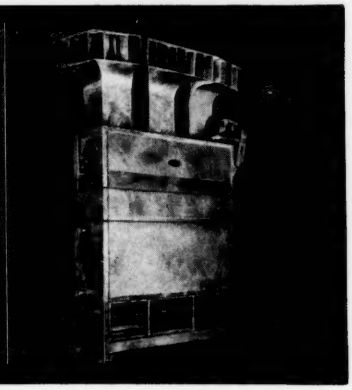
Carrier developed and introduced evaporative condensing in 1932. And today, Carrier offers this modernized line of Evaporative Condensers to meet the needs of industry where water is unusually warm or in short supply.

And remember, they are matched in size and performance to work with complete Carrier lines of Ammonia Compressors and Cold Diffusers. So when it's a question of ammonia refrigeration, Carrier is the place to come. Write for booklet specifying equipment you're interested in. Carrier Corporation, Syracuse, N. Y.

Carrier

AIR CONDITIONING
REFRIGERATION
INDUSTRIAL HEATING





CARRIER AMMONIA COMPRESSOR

CARRIER AMMONIA COLD DIFFUSER

1952 Ice Prices Show Slight Increases

Cross-section of ice distributors representing large and small markets in all sections report small increase in prices for 1952. Reported by 320 distributors in 297 cities.

THE tabulation of ice prices for 1952, following the trend of the last few years indicates a slight increase for most classes of ice over last year and for nearly all sections of the country. These figures are compiled from a survey, an annual feature of the May issue of ICE AND REFRIGERATION, representing 48 states, the District of Columbia and Canada. They are based upon replies from 320 ice distributors located in 297 cities.

The slight increases noted are not due to any upping of prices by individual ice companies, but rather to a fractional change in the personnel reporting; some companies reporting last year are not represented this year, and some new ones are included this year. A number of companies who reported last year asked to be excused in 1952 because they hoped, by the grace of OPS, to make some small upward alterations in their price structure.

The grand average for all classes of ice advanced from $9.08 per ton in 1951 to $9.49 per ton in 1952, an increase of 41 cents per ton. In 1950 this grand average was $8.71 per ton. Domestic ice advanced from 73.2 cents per 100 lbs to 73.8 cents, an increase of .6 cents. Commercial ice went from an average of 53.8 to 53.4 cents per 100 pounds, a decrease of .4 cents per 100 lbs. Wholesale ice advanced from $6.11 per ton to $6.45, an increase of 34 cents per ton.

Platform Prices

Price of ice at sales stations and plant platforms (per 100 lbs) continued the upward trend noted last year, increasing from an average of 62.4 cents in 1951 to 63.4 cents in 1952, an increase of one cent per 100 lbs. In 1950 the average was 58.2 cents. The average price per ton at sales stations and plant platforms increased from $8.11 in 1951 to $8.15 in 1952, an increase of only .04 cents per ton.

An increase was shown for all classes of ice except commercial. For dealers, the average price went from $6.29 to $6.75 a ton, an increase of 46 cents a ton; for car icing it went from $6.96 to $7.32, an increase of 36 cents; for carloads it was up $5.08 to $5.27, an increase of 19 cents.

Sectionally, the trends are not all increases. In the Eastern States, slight decreases are shown over last year for domestic, heavy commercial, and carloads. In the Southern States heavy commercial and carloads show small decreases. In the Midwestern states, fractional increases are shown for all classes. In the Western states, all classes showed nominal increases, except heavy commercial which took a sharp drop from $9.28 per ton last year to $7.66 per ton this year, a decrease of $1.62 per ton. It should be explained here that this does not indicate a trend but results from unusually low quotations from some distributors who were not included in the survey last year.

All of these figures are based upon arithmetical and not weighted averages, since it obviously would not be possible to obtain actual tonnage figures on such a large number of classifications, representing both large and small markets.

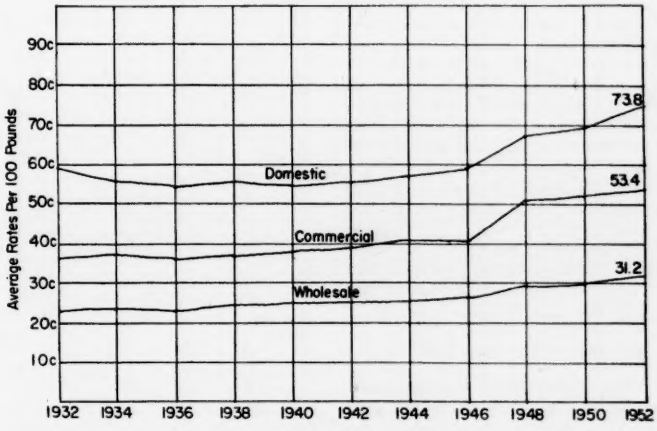
The smaller tables following the detailed tabulation provide summaries and break downs for the different sections and for the six main classifications of ice prices.

Crushed and Sized Ice

There is a continued trend toward increased sales of crushed ice. Of the 320 distributors, 281 reported such sales as compared to 270 of 301 concerns last year. Sales of both crushed ice and cubes are reported by 137 plants and crushed ice reported by 146 plants compared to 124 plants selling both crushed ice and cubes and 146 plants selling crushed ice only last year.

The price range for commercial crushed ice is from a low of 25 cents (only one reporting at this low price and two at 35 cents) to a high of $2.00 with average of 74.5 cents per 100 lbs. Last year the range was from 40 cents to $1.50 with an average of 73.6 cents per 100 lbs. Thirty-five distributors reported prices of $1.00 or more per 100 lbs as compared to 26 last year and 28 reported low prices of 50 cents or less per 100 lbs as compared to 22 reporting 50 cents or less last year.

There is a continuing slight trend toward basing prices of crushed ice on basis of 100 lbs. This year only 12 out of 320 plants quoted on basis of per bushel. These quotations are from a low of 40 cents to a high of 70 cents with an average of 54.7 cents per



Trend of average prices for domestic, commercial, and wholesale ice for twenty years, 1932-1952.

bushel. Last year 12 out of 301 plants quoted on basis of per bushel with a low of 30 cents to a high of 70 cents, and an average of 48 cents.

For crushed ice to the domestic trade, the price range is from a low of 50 cents to a high of $2.50, with an average of 90.6 cents per 100 lbs. Last year the range was from a low of 40 cents to a high of $2.00, with an average of 90.9 cents per 100 lbs.

In this classification the trend toward basing price on 100 lbs is reversed. Fifteen companies quoted prices per bushel from a low of 40 cents to a high of $1.00 with an average of 58.3 cents per bushel. Last year 11 companies quoted price per bushel from a low of 30 cents to a high of 90 cents and an average of 56.9 cents per bushel.

Although not requested specifically in this questionnaire, a number of companies volunteered the information that they have had a considerable increase in the sales of prepared ice. A New Mexico company, for instance, reports that crushed ice is about to replace all sales of block ice in their commercial trade.

Prices for Processed Ice

The tendency towards charging more for crushed or sized ice continues, although a considerable number of companies continue to charge the same, particularly for commercial use. There seems to be more companies, however, charging a slight differential for crushed ice, the general advance appearing to be about 10 cents more per 100 lbs.

An Arkansas company charges 75 cents per 100 lbs straight for crushed and cubed, both domestic and commercial compared to their light commercial rate of 60 cents. Ice companies in Indiana, Kansas, New Jersey and others charge 10 cents more for crushed than for block ice. A New Jersey company sells crushed ice for 5 cents more than for block ice. An Ohio company charges 20 cents more than for block ice and twice the price of block ice for cubes.

An interesting comparison on this question of price is that the general average for light commercial shown in Table VI for block ice is 62.6 cents per 100 lbs while the average shown above for crushed ice is 74.5 cents, a difference of 11.9 cents per 100 lbs.

Volume of Crushed Ice

The volume of crushed ice appears from these figures to have suffered a slight setback from last year and the year before for no apparent reason except possibly because of reduced tonnages in all classes. For 1952, sales are estimated by 142 distributors of 328,300 tons, an average of 2312 tons each. For 1951 these same concerns reported sales of 307,722 tons, an average of 2144 tons. In 1950 the figures were 297,406 tons and an average of 2,171 tons. In 1951, actual production figures were less than expectations of the previous year when 301 distributors reported expected sales of 353,600 tons, an average of 2,563.

Ice Cube Sales

Prices on ice cubes were reported by 137 companies compared to 126 last year. For commercial use, the price range is from a low of 45 cents to a high of $2.50 with an average of $1.18 per 100 lbs. Last year it was from 60 cents to $2.50 with an average of $1.21 per 100 lbs and an average of $1.05 the year before.

Here also the trend appears to be towards selling cubes by 100 pounds, although a goodly number continue to sell them by the bushel, 40 concerns making such quotations compared to 35 last year. The range for commercial is for a low of 60 cents to a high of $1.50 with an average of 87.9 cents per bushel. Last year the range was from a low of 60 cents to a high of $1.10 with an average of 85.1 cents per bushel. Other typical quotations are 50 cents per tub, 250 for 100 cubes; 50 cubes for 25 cents; 30 lb bag 50 cents, 50 lb bag 60 cents; 4 dozen cubes 25 cents.

For the domestic trade, the price range is from a low of 60 cents to a high of $3.20 and an average of $1.67 per 100 lbs. Last year the range was from 70 cents to $4.00 with an average of $1.70 per 100 lbs., and an average of $1.47 the year before. Only four companies quoted a price of $3.00 or more per 100 lbs.

In this case, also, the general trend of selling by 100 pounds seems to continue, 36 companies quoting prices per bushel as compared to 30 of the 301 concerns last year. The range (per bushel) is from a low of 70 cents to a high of $1.50 and an average of $1.13 per bushel. Last year the range was from a low of 70 cents to a high of $1.50 with an average of $1.03 per bushel. Other typical quotations are ½ bushel 60 cents; tub 70 cents; small bag 90 cents; 50 lb bag 60 cents; 4 dozen cubes 25 cents; 35 lb bag 70 cents.

Fruit and Vegetable Icing

There was a slight decrease over last year in the number of concerns selling crushed ice for fruit and vegetable icing to retail stores and to gardeners and shippers. Of the 320 concerns, 226 reported such sales compared with 233 out of 301 concerns last year. The price range to retail stores is from a low of 40 cents to a high of $1.50 and an average of 70.8 cents per 100 lbs. Last year the range was from 30 cents to $1.40 and an average of 67.1 cents and the year before an average of 65.2 cents per 100 lbs. For gardeners and shippers, the price range was from a low of $4.00 to a high of $16.00 and an average of $9.45 per ton. Last year the range was from $3.25 to $16.00 with an average of $9.12 per ton, compared to an average of $8.06 per ton the year before.

Reicing Produce Trucks

Sales of crushed ice for reicing produce trucks are slightly higher than last year, 186 distributors reporting sales for such purpose, compared to 172 last year and 178 the year before. The price range is from a low of $5.00 to a high of $16.00 and an average of $8.60 per ton. Last year the range was from $5.00 to $13.00, an average of $8.85 per ton and an average of $7.89 per ton the year before. The price of $8.00 appears to be a very popular rate, 60 companies of the 186 reporting, quoting that price.

Poultry Icing

Again this year, data was collected for sales of poultry icing which shows that 143 plants, or approximately 45 percent of those reporting, expect to sell ice for this purpose during 1952. Last year 147 plants, approximately 48 percent of those reporting, expected to sell ice for this purpose during 1951.

Vending Stations

From 110 distributors, reports on the number of vending stations in operation during 1951 and the number expected to be in operation for 1952 are, respectively, 285 and 330, an increase of approximately 16 percent. Last year 95 distributors reported 264 in operation in 1950 and 290 expected in 1951.

Percentage of Ice Sold

Reports on the percentage of ice sold for definite purposes was the following quoted for 1951 (arithmetic not weighted) domestic 40.4 percent, commercial 48.8 percent, other uses 10.8 percent. The previous year's report showed that the domestic was 42 percent, commercial 48 percent, other uses 10 percent.

Ice Prices for 1952

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books / Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Reicing Produce Trucks	Car Load Lots Mf'd Ice f. o. b. Plant
ALABAMA																	
Gadsden	.60	.60	No disc.	25	.60	9.50	.60	.60	.50	.40	7.50	.....	6.00	.....	.....	8.00	.....
Greenville	.70	.70	Cash disc.	...	.60	8.00	.80	.70	.70	.60	.....	.....	.....	.....	.....	8.00	.....
Mobile	.70	.70	No disc.	25	.55	7.00	.60	.60	.60	.50	.....	.....	7.00	8.00	.....	8.50	.....
Montgomery	.70	.70	No disc.	12½	.60	8.00	.60	.60	.60	.50	8.00	.50	8.00	.....	.....	8.00	.....
Opelika	.70	.70	Cash disc.	25	.60	9.50	.60	.60	.60	.50	.....	.50	7.00	8.00	.....	8.00	6.00
ARIZONA																	
Clifton	.80	.80	5%	25	.63	9.00	.80	.80	.80	.80	16.00	.80	8.40	.....	.....	.....	.....
Nogales	.70	.80	None	12½	1.00	6.75	.80	.70	.65	.65	6.75	.....	6.75	6.75	.....	8.00	5.50
Yuma	.70	.70	5%	25	.60	.....	.....	.....	.60	.50	8.00	.....	.....	.....	.....	7.02	.....
ARKANSAS																	
Conway	.60	.60	60c	25	.60	10.00	.60	.60	.60	.50	6.00	.60	6.00	.....	.....	10.00	.....
Forest City	.70	.70	5%	25	.60	.....	.60	.60	.60	.50	.....	.45	7.00	.....	.....	8.00	.....
Harrisburg	.70	.80	Cash disc.	25	.60	10.00	.80	.70	.70	.67	10.00	.67	7.00	.....	.....	10.00	.....
Helena	.70	.70	Cash disc.	25	.60	12.00	.60	.60	.60	.60	10.00	.50	10.00	.....	.....	.....	.....
Jonesboro	.60	.60	5%	25	.60	12.00	.60	.60	.60	.60	10.00	.60	6.00	.....	.....	.....	.....
Little Rock	.60	.60	No disc.	25	.50	9.00	.52	.50	.50	.50	8.00	.....	6.00	.....	.....	.....	.....
Lonoke	.60	.60	No disc.	25	.50	5.00	.60	.60	.60	.53	.....	.....	6.00	7.50	.....	7.00	5.00
Nettleton	.60	.60	None	25	.....	.....	.60	.60	.60	.....	.....	.....	6.00	.....	.....	.....	.....
Paragould	.58	.70	Cash disc.	25	.58	11.50	.60	.60	.55	.50	9.00	.45	6.00	10.00	.....	.....	.....
Texarkana	.70	.70	No disc.	25	.70	.....	.60	.60	.60	.50	7.00	.....	7.00	.....	.....	8.00	.....
CALIFORNIA																	
Alturas	1.00	1.10	None	25	.60	.....	1.00	1.00	.85	.75	12.00	.....	.....	14.00	.....	.....	.....
Hollister	.80	.85	.....	25	.....	6.50	1.00	.90	.80	.65	7.00	.....	6.15	.....	5.00	6.50	.....
Holtville	.75	.80	No disc.	25	.70	.....	.80	.80	.65	.55	11.00	.65	8.00	.....	.....	11.00	.....
Los Angeles	.70	.70	None	25	.70	8.00	.....	.70	.70	.70	.....	.25	5.00	.....	.....	.....	.....
San Bernardino	.90	.90	No disc.	25	.70	10.00	.80	.80	.80	.80	12.00	.60	8.00	4.50	4.25	6.00	.....
COLORADO																	
Boulder	.80	1.00	Cash disc.	25	.60	11.00	1.00	.80	.70	.70	12.00	.....	8.00	.....	.....	.....	.....
Colorado Springs	.75	.80	No disc.	25	.60	11.00	.80	.70	.65	.55	7.00	.60	7.00	7.50	4.75	7.00	4.75
Denver	.70	.70	None	25	.60	10.00	.60	.50	.45	.45	8.00	.....	5.00	4.90	4.60	7.00	5.00
Durango	1.00	1.20	None	25	.....	15.00	1.20	1.00	.90	.75	12.00	.....	10.00	.....	.....	.....	.....
Ft. Collins	.80	.90	.....	25	.50	7.00	.80	.60	.60	.50	.....	.....	6.00	.....	.....	.....	.....
Greeley	.75	.80	Cash disc.	25	.....	.....	.80	.70	.65	.....	6.00	.65	7.00	5.50	5.50	6.00	.....
Pueblo	.78	.78	Cash disc.	12½	.55	10.00	.80	.70	.55	.50	10.00	.....	10.40	.....	.....	.....	.....
Sterling	.80	.80	Cash disc.	25	.80	12.00	.80	.70	70	.70	10.00	.....	8.00	.....	8.00	10.00	.....
CONNECTICUT																	
Bridgeport	.70	.70	None	25	.60	.....	.60	.50	.50	.50	8.00	.40	5.33	.....	.....	8.00	.....
Manchester	.60	.70	.....	25	.60	9.00	.60	.60	.50	.30	.....	.....	5.00	.....	.....	.....	.....
Mystic	.70	.70	None	25	.70	.....	.60	.60	.60	.60	6.00	.40	6.00	.....	.....	.....	.....
Norwalk	.70	.75	None	25	.55	9.00	.60	.50	.50	.40	6.67	.50	4.67	.....	.....	8.00	4.00
Stamford	.70	.70	.....	25	.50	8.00	.60	.50	.50	.50	7.50	.35	5.00	.....	.....	8.00	.....
Torrington	.60	.70	.....	25	.60	8.00	.80	.70	.60	.40	8.00	.55	5.00	.....	.....	.....	.....
Waterbury	.70	.70	No disc.	25	.60	8.00	.60	.50	.50	.50	.....	.....	5.00	10.00	.....	.....	.....
DELAWARE																	
Dover	.60	.70	No disc.	25	.60	10.00	.60	.60	.55	.40	8.00	.40	6.00	.....	.....	8.00	.....
Milford	.55	.66	None	25	.50	8.00	.56	.56	...	.40	8.00	.40	.....	.....	.....	8.00	.....
Wilmington	.70	.70	None	25	.60	10.00	.60	.50	.50	.40	8.00	.50	6.00	7.50	7.00	7.33	4.00
DISTRICT OF COLUMBIA																	
Washington	.70	.70	.....	25	.60	9.00	.80	.80	.80	.80	7.00	.30	6.50	9.00	.....	7.00	.....
FLORIDA																	
DeFuniak Springs	.60	.60	.....	25	.50	7.00	.60	.50	.50	.50	7.00	.....	6.00	7.00	.....	7.00	.....
Ft. Myers	.68	.68	None	12½	.56	7.00	.56	.56	.56	.35	6.00	.30	6.80	.....	.....	7.00	.....
Jacksonville	.70	.70	Same	25	.60	9.00	.60	.60	.60	.60	.....	.45	8.00	8.00	.....	7.00	4.00
Mulberry	.60	.60	No disc.	16⅔	.50	9.00	.60	.60	.60	.60	.....	.....	6.00	.....	.....	8.00	.....
Orlando	.70	.70	.....	25	.50	10.00	.60	.60	.60	.50	8.00	.40	.....	.....	.....	8.00	.....
Panama City	.70	.75	No disc.	25	.65	12.00	.60	.60	.60	.60	.....	.30	7.00	.....	.....	8.00	.....
Plant City	.60	.60	No disc.	25	.55	9.00	.60	.60	.60	.60	.....	.....	9.00	6.50	.....	8.00	.....
Tampa	.60	.60	No disc.	..	.30	6.00	.60	.50	.50	.30	10.00	.30	6.00	.....	.....	6.00	6.00
Winter Haven	.68	.68	Cash disc.	..	.....	.....	.68	.68	.68	.68	.....	.68	8.50	.....	.....	10.00	.....
GEORGIA																	
Atlanta	.70	.70	No disc.	25	.55	9.00	.60	.60	.60	.50	8.00	.45	7.00	.....	.....	8.00	6.00
Brunswick	.60	.60	No disc.	12	.60	12.00	.60	.60	.60	.60	8.00	.34	8.00	7.00	5.00	8.00	5.00
Columbus	.70	.70	No disc.	25	.70	.....	.60	.60	.60	.50	10.00	.70	7.00	.....	10.00	10.00	.....
Gainesville	.60	.60	.....	25	.45	7.00	.60	.50	.50	.35	8.00	.....	.....	7.00	.....	.....	.....
Griffin	.70	.70	No disc.	25	.60	8.00	.80	.70	.70	.60	.....	.50	7.00	.....	.....	9.00	.....
LaGrange	.70	.70	No disc.	25	.70	.....	.60	.60	.60	.40	.....	.....	7.00	.....	.....	10.00	.....
Macon	.70	.70	No disc.	12½	.70	14.00	.72	.60	.60	.50	6.00	.40	.....	.....	.....	10.00	6.00
Valdosta	.70	.70	Cash disc.	..	.70	10.00	.72	.60	.60	.....	.....	.70	6.00	.....	.....	7.00	.....

Annual Report of Ice Prices—Continued

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Retail Producer Trucks	Car Load Lots M'f'd Ice f. o. b. Plant
IDAHO																	
Boise	.80	.90	Cash disc.	..	.50	5.00	.90	.80	.80	.80	8.00	.50	10.00	.....	4.50	8.00	4.00
Caldwell	1.00	1.00	None	25	.80	5.00	1.00	.80	.80	.60	5.00	.....	6.00	.....	.....	7.00	4.00
Idaho Falls	.65	.80	.....	25	.50	7.50	1.00	.80	.60	.50	7.00	.60	7.00	5.00	5.00	7.00	5.00
Nampa	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.75	6.00	4.72
Twin Falls	.65	1.00	None	10c	.70	12.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ILLINOIS																	
Belleville	.68	.68	No disc.	25	.58	.....	.60	.60	.60	.60	.....	.....	6.00	.....	.....	.....	.....
Bloomington	.70	.70	No disc.	25	.60	12.00	.....	.....	.60	.60	6.00	.30	5.50	6.00	.....	8.00	5.00
Champaign	.60	.60	No disc.	25	.60	12.00	.60	.60	.60	.60	12.00	.....	6.00	10.00	12.00	11.00	.....
Clinton	.75	.75	No disc.	25	.60	10.00	.68	.66	.66	.66	10.00	.....	5.50	.....	6.50	10.00	.....
Dixon	.70	.70	.....	25	.60	.....	.60	.60	.60	.60	.....	.....	6.00	7.50	.....	.....	.....
Peoria	.76	.76	No disc.	25	.56	8.60	.60	.60	.60	.60	6.80	.40	6.80	7.00	.....	10.00	.....
Rock Island	.68	.90	.....	25	.68	8.60	.60	.60	.60	....	5.50	.38	5.50	6.50	.....	.....	5.50
Springfield	.70	.70	Cash disc.	25	.65	12.00	.60	.60	.60	.60	9.00	.45	6.40	8.25	6.25	9.00	4.75
INDIANA																	
Gary	.60	.70	Cash disc.	25	.60	9.00	.80	.70	.60	.50	10.00	.45	5.50	9.00	.....	10.00	7.00
Greensberg	.70	.70	Cash disc.	25	.50	9.00	.60	.60	.60	.50	10.00	.....	5.00	7.00	6.00	10.00	.....
Hammond	.70	.80	None	25	.60	12.00	.60	.60	.60	.60	10.00	.....	6.00	10.00	.....	12.00	.....
Indianapolis	.70	.70	None	25	.65	7.00	.60	.60	.60	.55	7.00	.....	7.00	.....	.....	.....	.....
Kokomo	.80	.80	.....	25	.80	14.00	.80	.80	.80	.70	6.50	.80	7.00	.....	.....	.....	.....
Lafayette	.80	.80	Cash disc.	25	.65	11.60	.80	.70	.70	.50	8.00	.....	6.50	8.00	.....	8.00	.....
New Albany	.60	.60	None	25	.50	5.00	.60	.50	.50	.40	.....	.....	6.00	.....	.....	8.00	.....
New Castle	.80	.80	Cash disc.	..	.70	10.00	.60	.60	.60	.60	.....	.....	.....	.....	.....	.....	.....
Shelbyville	.70	.70	No disc.	25	.60	7.00	.60	.60	.60	.60	12.00	.35	8.00	7.00	7.00	10.00	8.00
South Bend	.80	.80	No disc.	25	.70	12.00	.72	.70	.70	.70	12.00	.70	9.00	10.00	.....	9.00	5.00
Terre Haute	.60	.60	.....	25	.50	10.00	.60	.60	.60	.50	9.00	.50	6.00	8.50	.....	9.00	.....
IOWA																	
Boone	.70	.70	No disc.	50	..	6.00	.60	.60	.60	.....	.....	.....	6.00	5.50	5.00	.....	.....
Cedar Rapids	.80	.70	Cash disc.	25	.50	.....	.80	.60	.60	.....	.....	.....	.....	.....	.....	9.00	.....
Centerville	.70	.70	Cash disc.	..	.50	10.00	.80	.60	.60	.50	7.50	.60	7.50	6.00	5.50	5.00	6.00
Clinton	.75	.75	No disc.	25	.60	11.00	.72	.66	.65	.65	.....	.60	.....	.....	.....	.....	.....
Guttenberg	.50	.60	No disc.	25	.40	10.00	.50	.50	.50	.40	8.00	.40	8.00	.....	.....	10.00	.....
Mason City	.70	.80	.....	30	....	9.00	.76	.68	.60	.60	10.00	....	6.50	6.50	6.50	10.00	.....
Sioux City	.70	.70	No disc.	25	.50	10.00	.72	.70	.70	.70	14.00	.50	7.50	.....	.....	.....	.....
Waterloo	.70	.70	Cash disc.	25	.70	12.00	.60	.50	.50	.40	7.00	....	5.00	8.00	5.00	8.00	5.00
KANSAS																	
Beloit	.80	.80	Cash disc.	25	.70	.....	1.00	1.00	1.00	.90	.....	....	8.00	14.00	.....	10.00	.....
Junction City	.65	.72	Cash disc.	25	.63	10.00	.60	.60	.60	.50	.....	.65	6.67	8.00	.....	10.00	6.00
Lawrence	.70	.70	No disc.	25	.70	12.00	.80	.70	.70	.60	6.00	.35	6.50	.....	.....	8.00	.....
Manhattan	.70	.70	No disc.	25	.70	.....	.80	.70	.70	.....	.....	.....	8.00	5.75	5.75	.....	.....
Newton	.70	.70	65c	25	.50	8.00	.80	.60	.60	.45	8.00	.50	7.00	.....	5.00	8.00	.....
Pittsburg	.70	.80	No disc.	25	.70	12.00	.80	.70	.70	.70	8.00	.....	7.00	7.00	7.00	7.00	.....
Topeka	.70	.80	Cash disc.	25	.70	7.00	.80	.70	.70	.40	6.30	.70	9.00	10.00	.....	8.00	.....
Wellington	.75	.75	.....	25	.70	6.00	.80	.70	.70	.50	7.40	.....	.....	.....	8.00	7.40	7.40
Wichita	.68	.76	No disc.	25	.50	9.00	.68	.64	.64	.64	9.00	.45	7.00	7.00	5.00	9.00	5.00
KENTUCKY																	
Danville	.70	.70	No disc.	12	.60	10.00	.60	.60	.60	.50	10.00	.....	5.50	.....	10.00	8.00	.....
Louisville	.70	.70	None	25	.55	8.00	.80	.70	.70	.62	8.00	.....	8.00	.....	8.00	8.00	.....
Mayfield	.70	.70	Cash disc.	25	.55	.....	.60	.60	.60	.50	8.00	.50	7.00	7.00	7.00	7.00	.....
Princeton	.80	.80	Cash disc.	10c	.60	10.00	.80	.70	.70	.....	.....	.60	6.00	10.00	.....	.....	.....
Richmond	.80	.80	Cash disc.	25	.70	12.00	.80	.70	.70	.50	.....	.70	6.50	.....	.....	10.00	.....
Shelbyville	.50	.60	5%	25	.50	10.00	.60	.50	.50	.42	.....	.....	5.00	.....	.....	.....	.....
LOUISIANA																	
Alexandria	.70	.70	No disc.	25	.50	9.00	.60	.60	.60	.45	9.00	.45	9.00	.....	.....	9.00	.....
Baton Rouge	.70	.70	5%	12½	.45	8.00	.60	.60	.60	.50	8.00	.45	8.00	.....	.....	8.00	.....
Bogalusa	.60	.60	10%	12c	.50	10.00	.....	.60	.60	.60	7.40	.....	7.40	.....	.....	.....	.....
Ferriday	.70	.70	No disc.	25	.60	7.00	.60	.60	.60	.60	.....	.35	7.00	.....	.....	.....	.....
Houma	.40	.40	.....	..	.40	7.00	.40	.40	.40	.35	5.00	.25	5.00	.....	.....	.....	.....
Lake Charles	.60	.60	5%	25	.60	10.00	.60	.60	.50	.40	8.00	.40	6.00	6.00	6.00	5.00	5.00
Monroe	.70	.70	No disc.	25	.55	7.00	.60	.60	.60	.60	.....	.55	7.00	7.00	.....	8.00	.....
New Orleans	.60	.60	None	25	.60	8.20	.60	.52	.52	.45	7.00	.....	5.50	6.40	.....	9.00	4.50
MAINE																7.00	5.50
Bangor	.70	.70	.....	34	.60	8.00	.60	.60	.60	.40	7.00	.35	5.00	6.00	.....	8.00	5.00
Rumford	.60	.60	None	25	.50	.....	1.00	.70	.60	.42	6.00	.....	5.00	.....	.....	.....	.....
Waterville	.80	.80	Cash disc.	25	.60	8.00	.....	.....	.35	....	7.00	.40	.....	8.00	.....	.....	.....
MARYLAND																	
Easton	.65	.70	.....	..	.60	7.00	.60	.60	.60	.50	7.00	....	10.00	.....	5.00	7.00	4.00
Frederick	.60	.60	No disc.	12½	.60	11.00	.60	.60	.55	.40	8.00	.35	4.50	.....	.....	8.00	.....
Frostburg	.75	.75	.....	50	.75	7.00	.60	.60	.50	.50	14.00	....	7.00	.....	.....	14.00	.....
Salisbury	.70	.70	None	25	.60	10.00	.60	.60	.60	.50	8.00	.50	6.00	.....	.....	7.33	5.00

Annual Report of Ice Prices—Continued

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books — Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Reicing Produce Trucks	Car Load Lots M'f'd Ice f. o. b. Plant
MASSACHUSETTS																	
Attleboro	.70	.70	.....	..	.60	.....	.60	.60	.50	.30	6.00	.....	5.00	.....	.....	.....	.....
Beverly	.75	.80	.....	25	.60	10.00	1.00	.80	.70	.60	6.00	.....	.....	.....	.....	.....	.....
Greenfield	.80	.80	No disc.	25	.75	.....	.65	.60	.60	.50	8.00	.....	5.00	.....	.....	11.00	.....
Holyoke	.70	.70	.....	20	.60	8.00	.60	.50	.50	.40	.....	.40	5.00	8.00	.....	8.00	.....
Leominster	.70	.70	.....	50	.40	7.00	.....	.60	.60	.35	5.75	.....	5.75	.....	.....	.....	.....
Lowell	.70	1.20	.....	30	.50	6.00	1.00	1.00	.50	.25	4.50	.25	5.00	.....	.....	7.00	.....
Medford	.75	.80	None	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Harwich	.80	.90	None	25	.70	8.67	.80	.70	.70	.70	.....	.55	7.33	.....	.....	.....	.....
Worcester	.70	.70	None	25	.60	4.50	.60	.50	.50	.25	5.00	.40	5.00	7.00	.....	.....	.....
MICHIGAN																	
Ann Arbor	.80	.80	70c	25	.50	8.00	.60	.50	.50	.50	8.00	.40	5.40	10.00	.....	10.00	.....
Flint	.80	.80	No disc.	25	.70	14.00	.80	.80	.80	.....	.....	.....	8.00	7.00	.....	8.00	.....
Jackson	.80	.80	No disc.	25	.70	13.00	.80	.80	.70	.....	.....	.....	6.20	14.00	.....	16.00	.....
Lansing	.70	.70	No disc.	25	.65	11.00	.60	.60	.60	.50	8.60	.....	8.00	.....	.....	.....	.....
Manistee	.80	.80	No disc.	25	.60	10.00	.72	.70	.70	....	10.00	.50	8.00	10.00	.....	10.00	.....
South Haven	.80	.80	No disc.	25	.80	14.00	.80	.80	.80	.80	15.00	.50	6.50	7.50	.....	9.00	.....
Traverse City	.....	.....	.....	..	.....	.....	.60	.60	.60	....	12.00	.50	6.00	.....	10.00	10.00	.....
MINNESOTA																	
Brainerd	.60	.80	None	25	.50	8.00	.60	.50	.40	.40	5.00	.....	.....	.....	.....	.....	.....
Minneapolis	.80	.80	No disc.	25	.70	12.00	.80	.80	.80	.80	8.00	.30	6.05	6.00	6.00	.....	5.00
New Ulm	.75	1.00	.....	35	.75	.....	1.20	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul	.80	.80	No disc.	25	.70	6.50	.80	.80	.80	.....	.....	.....	6.00	.....	.....	.....	.....
Worthington	.60	.60	No disc.	25	.50	6.00	.60	.60	.60	.50	8.00	.....	.....	5.00	.....	8.00	.....
MISSISSIPPI																	
Eupora	.60	.60	No disc.	25	.50	10.00	.60	.60	.60	.....	.....	.....	7.00	.....	.....	6.00	.....
Hollandale	.70	.70	No disc.	25	.....	.....	.80	.70	.70	.50	.....	.50	7.00	.....	.....	.....	.....
Jackson	.70	.70	No disc.	12½	.55	10.00	.60	.60	.60	.50	10.00	.....	6.00	7.00	.....	7.00	.....
Vicksburg	.70	.70	No disc.	25	.60	8.00	.60	.60	.60	.40	10.00	.35	8.00	.....	.....	8.00	.....
MISSOURI																	
Cape Girardeau	.66	.76	No disc.	25	.66	11.00	.60	.60	.60	.56	8.40	.....	5.66	.....	.....	8.40	5.00
Carthage	.50	.60	No disc.	25	.50	10.00	.60	.60	.50	.35	7.00	.....	5.50	5.50	5.50	7.00	5.00
Columbia	.65	.65	60c	25	.55	9.00	.60	.60	.50	.50	.....	.30	7.20	.....	.....	.....	.....
Fayette	.60	.70	Cash disc.	25	.60	.....	.80	.60	.50	.40	.....	.....	5.40	.....	.....	.....	.....
Independence	.70	.70	.....	..	.40	6.00	.60	.60	.60	.40	6.00	.40	6.00	.....	.....	8.00	.....
Joplin	.70	.70	No disc.	25	.60	12.00	.80	.70	.70	.40	7.00	.....	7.00	.....	.....	.....	.....
Kansas City	.55	.70	No disc.	25	.55	11.00	.60	.60	.60	.50	10.00	.55	7.00	6.25	.....	7.00	4.75
Marshall	.70	.80	Cash disc.	25	.55	8.50	.80	.60	.60	.45	6.50	.60	6.50	5.00	.....	6.00	.....
Poplar Bluff	.64	.64	Cash disc.	25	.54	8.80	.56	.56	.50	.44	8.80	.45	5.66	7.00	.....	8.00	.....
St. Louis	.80	.80	No disc.	25	.60	10.00	.80	.80	.80	.60	7.00	.60	7.00	.....	.....	.....	4.50
MONTANA																	
Butte	.80	1.00	No disc.	25	.60	8.00	.80	.60	.60	.60	7.00	.....	4.50	10.00	10.00	10.00	8.00
Helena	.80	.80	No disc.	25	.70	12.00	.80	.80	.80	.70	12.00	.....	.....	.....	.....	12.00	.....
Lewistown	.70	.70	No disc.	25c	.....	.....	.60	.60	.60	.40	6.00	.....	.....	.....	.....	.....	.....
Miles City	1.00	1.00	None	25	1.00	.....	1.00	1.00	1.00	1.00	9.70	.....	15.00	9.70	15.00	15.00	9.70
NEBRASKA																	
Falls City	.70	.70	Cash disc.	25	.....	.....	.60	.60	.50	.42	.....	.45	6.75	.....	.....	.....	.....
Kearney	.60	.70	10%	20	.60	9.00	.60	.60	.60	.60	.....	.45	9.00	8.00	8.00	8.00	.....
Lincoln	.60	.60	No disc.	25	.60	12.00	.60	.60	.50	.50	7.00	.35	6.00	.....	.....	8.00	4.00
North Platte	.80	.80	5%	25	.60	10.00	.72	.70	.70	.55	8.25	.....	7.50	.....	.....	10.00	.....
Omaha	.70	.70	No disc.	25	.60	10.00	1.00	.60	.60	.50	5.50	.60	5.50	6.50	.....	9.00	4.50
NEVADA																	
Boulder City	1.20	1.40	.....	25	1.20	.....	1.20	1.20	1.20	1.20	.....	.....	.....	.....	.....	.....	.....
Las Vegas	.80	1.00	.....	..	.80	12.00	1.00	1.00	.80	.55	12.00	.90	10.00	.....	.....	9.00	.....
NEW HAMPSHIRE																	
Bristol	.65	.70	.....	15c	.60	.....	.80	.80	.60	....	5.00	.....	.....	.....	.....	.....	.....
Dover	.60	.60	.....	20c	.60	10.00	.80	.60	.60	.60	.....	.....	5.00	10.00	.....	.....	.....
Manchester	.60	.70	5%	20c	.50	8.00	.60	.50	.40	.30	6.00	.35	5.50	7.00	.....	.....	.....
Nashua	.60	.60	None	35	.45	7.50	.60	.50	.50	.50	8.00	.35	4.00	10.00	.....	.....	.....
Plymouth	.70	.70	None	..	.60	.....	.....	.....	.60	.....	.....	.....	.....	.....	.....	.....	.....
NEW JERSEY																	
Bridgeton	.50	.60	None	..	.50	5.50	.....	.....	.55	.....	6.00	.50	5.00	.....	.....	.....	5.00
Glassboro	.65	.70	.....	25	.....	.....	.80	.70	.65	.58	11.80	.45	5.63	5.50	5.50	.....	.....
Hackettstown	.50	.60	None	30	.50	7.00	.60	.60	.50	.33	7.00	.60	4.67	.....	.....	7.35	.....
Newton	.50	.50	None	25	.45	5.00	.40	.40	.40	.27	5.60	.40	4.55	.....	.....	6.30	.....
NEW MEXICO																	
Albuquerque	.70	.80	Cash disc.	12½	.50	9.00	.60	.60	.60	.50	10.00	.50	8.00	.....	.....	10.00	.....
Gallup	1.00	1.00	.....	.....	.90	15.00	.....	.....	1.00	...	15.00	...	15.00	.....	15.00	.....	.....
Tucumcari	.80	1.00	None	25	.70	12.00	.80	.70	.70	.60	10.00	.80	10.00	5.00	5.50	10.00	5.00

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Retcing Produce Trucks	Car Load Lots M/C Ice f. o. b. Plant
NEW YORK																	
Auburn	1.00	1.00	No disc.	25	.80	14.00	.80	.80	.80	.80	9.00	.70	7.00	.....	8.00	8.00	.....
Binghampton	.80	.80	70c	25	.70	8.00	.60	.50	.50	.40	6.00	.....	5.00	.....	.....	8.00	.....
Jamestown	.70	.70	No disc.	25	.70	8.00	.60	.50	.50	.40	.....	.....	7.00	8.00	.....	.....	.....
Kingston	.60	.60	None	25	.50	8.00	.60	.50	.50	.30	5.00	.30	4.00	8.00	.....	8.00	.....
Lackawanna	.80	.80	None	25	.80	.....	.80	.80	.80	.80	.....	.36	6.00	.....	.....	.....	.....
New York	.75	.75	None	15	.57	9.00	.60	.60	.60	.....	.....	.33	7.00	8.00	.....	.....	.....
Rochester	.80	.80	Cash disc.	25	.60	12.00	.72	.70	.70	.65	.....	.....	6.33	12.00	.....	8.00	.....
Syracuse	.70	.80	Cash disc.	25	.70	10.00	.....	.....	.....	.....	.....	.70	7.00	.....	.....	8.00	.....
Troy	.70	.80	None	25	.50	7.00	.60	.60	.60	.40	8.00	.....	.....	.....	.....	.....	.....
NORTH CAROLINA																	
Asheville	.70	.70	No disc.	25	.60	12.00	.60	.60	.60	.50	10.00	.....	7.00	8.00	5.50	11.00	4.50
Charlotte	.70	.70	No disc.	25	.70	11.00	.80	.70	.60	.50	8.00	.40	8.00	7.00	.....	8.00	.....
Goldsboro	.60	.70	No disc.	25	.60	8.00	.60	.60	.60	.50	.....	.70	9.00	10.00	.....	8.00	.....
Greensboro	.70	.70	No disc.	25	.70	11.00	.60	.60	.60	.40	8.00	.40	6.66	7.00	.....	10.00	.....
Henderson	.70	.70	No disc.	25	.60	8.00	.80	.70	.70	.60	.....	.40	.....	.....	.....	8.00	.....
Wilson	.70	.70	No disc.	25	.70	11.00	.60	.60	.60	.50	.....	.60	7.00	.....	.....	.....	.....
NORTH DAKOTA																	
Bismarck	1.00	1.00	8%	50	1.00	.....	1.00	1.00	1.00	.80	6.00	.....	6.00	.....	.....	.....	.....
Dickinson	1.00	1.00	90c	15	.90	.....	1.00	1.00	1.00	.90	.....	.....	.....	.....	.....	.....	.....
Grand Fork	.80	.80	10%	25	.60	8.00	1.00	.90	.....	.....	8.00	.....	.....	.....	.....	.....	.....
Minot	.50	.60	.....	40	.50	6.00	.60	.50	.50	.50	7.00	.....	5.00	4.00	5.00	8.00	.....
OHIO																	
Ashland	.60	.75	Cash disc.	25	.60	.....	.80	.60	.60	.42	7.00	.....	.....	.....	.....	12.00	.....
Cambridge	.60	.60	No disc.	25	.50	10.00	.60	.50	.50	.50	.....	.....	7.00	.....	.....	7.00	.....
Canton	.80	.80	None	25	.80	12.00	.72	.70	.70	.60	8.00	.....	6.50	11.00	8.00	8.00	6.00
Dayton	.70	.70	None	25	.70	12.00	.80	.60	.60	.45	.....	.98	6.50	.....	.....	.....	.....
Hamilton	.80	.80	None	25	.70	10.00	.72	.70	.70	.60	10.00	.70	7.67	.....	.....	10.00	.....
Mansfield	.80	.80	70	25	.60	9.00	.80	.70	.70	.60	10.00	.45	.....	10.00	.....	.....	.....
Middletown	.80	.80	No disc.	25	.70	12.00	.72	.70	.70	.50	.....	.46	7.00	.....	.....	.....	.....
Springfield	.75	.80	Cash disc.	25	.65	.....	.80	.70	.65	.55	.....	.....	7.00	9.00	.....	.....	.....
Tiffin	.80	.80	75c	25	.70	12.00	.80	.70	.70	.70	.....	.50	10.00	.....	.....	10.00	.....
Toledo	.80	.80	No disc.	25	.70	12.00	.80	.70	.70	.60	11.00	.43	7.00	9.50	.....	11.00	.....
Warren	.70	.70	No disc.	25	.60	12.00	.60	.60	.60	.60	10.00	.60	8.00	12.00	.....	12.00	.....
OKLAHOMA																	
Bartlesville	.80	.80	No disc.	25	.65	10.00	.70	.70	.70	.50	8.00	.....	7.00	.....	.....	.....	.....
Enid	.90	.90	No disc.	25	.60	10.00	.80	.80	.80	.50	.....	.....	7.50	7.50	6.50	9.00	5.00
O'Keene	.75	.80	None	...	.70	14.00	.80	.80	.70	.70	.....	.....	8.00	.....	.....	.....	.....
Shawnee	.60	.70	None	12½	.55	11.00	.60	.50	.50	.45	6.00	.35	7.00	7.00	7.00	9.00	.....
Walters	.65	.70	Cash disc.	...	.40	7.00	.60	.60	.55	.....	.....	.....	.....	7.00	.....	8.00	.....
OREGON																	
Albany	.....	.....	.....	...	.....	.....	1.00	.90	.75	.50	10.00	.50	7.00	.....	5.00	7.00	5.00
Klamath Falls	.80	1.00	5%	25	.90	10.00	.80	.80	.75	.75	8.00	.50	8.00	8.00	5.00	10.00	4.00
Portland	.90	1.00	10%	25	.90	11.65	1.00	.90	.80	.52	7.00	.60	8.00	6.50	6.50	10.00	5.00
Salem	.75	.90	Cash disc.	25	.90	15.00	1.00	.90	.75	.42	7.00	.25	7.00	5.00	5.00	6.00	5.00
PENNSYLVANIA																	
Berwick	.60	.60	.....	...	.60	.....	.60	.60	.50	.42	5.00	.....	.....	.....	.....	8.00	.....
Harrisburg	.60	.60	.....	25	.50	.....	.60	.50	.50	.50	.....	.....	5.25	.....	.....	.....	.....
Lancaster	.60	.60	None	25	.45	6.00	.70	.60	.60	.40	6.50	.37	5.50	8.00	6.25	6.25	6.00
Meadville	.80	.80	None	25	.80	.....	.80	.80	.80	.60	7.00	....	6.67	7.00	.....	.....	.....
Pottsville	.60	.60	.....	25	.60	10.00	.80	.60	.60	.50	.....	.40	5.60	7.00	.....	.....	.....
Reading	.65	.65	None	25	.55	.....	.80	.50	.....	.34	.....	.30	6.00	6.65	6.00	.....	.....
Sharon	.80	.80	No disc.	25	.70	13.40	.60	.60	.60	.42	.....	.....	6.65	13.40	.....	13.40	.....
York	.70	.80	No disc.	...	.60	10.00	.60	.60	.60	.40	8.00	.....	5.60	.....	.....	8.00	.....
RHODE ISLAND																	
Bristol	.80	.80	.....	25c	.60	8.00	.....	.....	.50	.50	10.00	.....	4.60	.....	.....	.....	.....
Pawtucket	.70	.70	.....	25	.50	10.00	.....	.60	.60	.60	.....	.25	4.00	.....	.....	.....	.....
SOUTH CAROLINA																	
Anderson	.70	.70	No disc.	50	.70	14.00	.80	.70	.70	.70	14.00	.....	.....	.....	.....	.....	.....
Greenville	.70	.70	.....	...	.50	10.00	.80	.60	.60	.45	9.00	.....	6.67	6.67	5.50	9.00	5.00
Hampton	.70	.70	No disc.	50	.60	6.00	.80	.70	.70	.60	10.50	.....	8.40	.....	.....	.....	.....
Newberry	.70	.70	No disc.	12½	.70	12.00	.80	.70	.70	.60	.....	....	.....	.....	.....	.....	.....
Seneca	.70	.70	60c	25	.60	.....	.80	.60	.60	.45	.....	.60	6.00	.....	.....	.....	.....
Sumter	.70	.70	10%	25	.63	.....	.80	.70	.70	.70	.....	.47	9.40	10.00	7.00	8.50	6.00
SOUTH DAKOTA																	
Deadwood	.90	1.00	.....	25	.90	.....	1.00	.90	.90	.....	.....	.....	.....	.....	.....	.....	.....
Gregory	1.00	1.50	Cash disc.	50c	1.00	15.00	1.20	1.20	1.00	1.00	15.00	.....	15.00	.....	.....	15.00	.....
Huron	1.00	1.00	No disc.	25	.75	8.00	1.00	1.00	1.00	.75	8.00	.....	.....	.....	.....	.....	.....
Rapid City	.70	.80	No disc.	25	.60	8.00	1.00	.80	.70	.50	7.00	.60	6.50	7.50	.....	6.00	6.00
Sioux Falls	.85	.90	85c	25	.70	9.00	.80	.60	.....	.....	7.00	....	7.00	6.50	.....	7.00	5.00

Annual Report of Ice Prices—Concluded

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton				
	Over 100 lbs.	Under 100 lbs.	Coupon Books Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Retcing Produce Trucks	Car Load Lots Mfrs. f. o. b. Plant
TENNESSEE																	
Cleveland	.70	.70	No disc.	12½	.70	12.00	.80	.70	.70	.60	8.00	....	7.00	.....	8.00	10.00	.....
Jackson	.60	.60	.....	12½	.46	8.00	.....	.....	.60	.....	.....	.....	.....	.....	.....	.....	.....
Knoxville	.70	.70	.....	25	.60	12.00	.60	.60	.60	.50	10.00	.60	7.00	10.00	.....	10.00	.....
Maryville	.60	.60	No disc.	25	.50	8.00	.60	.60	.60	.50	8.00	.....	.....	.....	.....	8.00	.....
Mt. Pleasant	.70	.70	5%	25	.70	8.00	.80	.70	.70	.50	8.00	.....	.....	.....	.....	.....	.....
Tullahoma	.60	.60	No disc.	12½	.50	.....	.60	.50	.50	.43	8.00	.60	6.00	12.00	8.00	.....	.....
TEXAS																	
Abilene	.60	.80	No disc.	12½	.60	10.00	.80	.80	.80	.60	10.00	.45	7.00	10.00	.....	10.00	.....
Brady	.70	.80	No disc.	25	.70	10.00	.60	.50	.50	.35	7.00	.....	7.00	7.00	7.00	7.00	.....
Brownwood	.60	.70	.....	25	.50	6.00	.60	.60	.60	.60	7.00	.....	6.67	7.00	6.00	7.00	5.00
Denton	.70	.70	No disc.	25	.60	12.00	.80	.70	.70	.60	12.00	.35	7.00	8.00	.....	12.00	8.00
Ft. Worth	.70	.70	No disc.	25	.60	12.00	.60	.60	.60	.60	.....	.60	7.00	.....	.....	7.00	.....
Graham	.60	.60	No disc.	25	.60	.....	.60	.60	.55	.45	.....	.60	6.66	6.00	6.00	6.00	.....
Longview	.50	.50	No disc.	12½	.50	6.00	.52	.50	.50	.50	8.00	.40	5.50	.....	.....	8.00	4.00
Marshall	.60	.60	No disc.	12½	.50	6.00	.60	.50	.50	.50	7.00	.35	6.00	7.00	7.00	7.00	3.00
Plainview	.70	.80	No disc.	25	.60	.....	.80	.70	.70	.37	7.20	....	7.70	7.70	.....	8.00	.....
San Antonio	.60	.60	No disc.	12½	.48	8.00	.56	.56	.56	.40	8.00	.40	6.00	.....	.....	7.00	4.50
UTAH																	
Ogden	.70	.80	.....	25	.50	8.00	.60	.50	.40	.35	5.00	....	.....	.....	.....	5.00	4.50
Park City	.75	.75	.....	..	.....	.....	1.00	1.00	.75	.75	.....	.....	.....	.....	.....	.....	.....
Salt Lake City	.75	.80	No disc.	25	.60	8.00	.80	.70	.65	.40	5.00	.40	5.00	.....	.....	.....	4.50
VERMONT																	
Brattleboro	.80	.80	Cash disc.	25	.70	8.50	.80	.70	.70	.65	8.00	.....	7.00	.....	.....	.....	.....
Springfield	.60	.60	No disc.	25	.50	8.00	.60	.50	.50	.50	.....	.....	6.00	.....	.....	.....	.....
VIRGINIA																	
Bristol	.70	.70	No disc.	25	.70	10.00	.60	.60	.60	...	.....	.....	7.00	5.00	.....	10.00	.....
Charlottesville	.70	.80	10%	10	.45	8.00	.80	.60	.50	.40	8.00	.45	6.00	7.00	.....	8.00	7.00
Danville	.80	.80	No disc.	25	.65	.....	.80	.80	.80	.60	.....	.80	.....	.....	.....	13.00	.....
Farmville	.70	.75	No disc.	12½	.70	.....	.80	.70	.70	.70	.....	....	7.33	.....	.....	8.00	.....
Hopewell	.60	.60	None	25	.....	.....	.60	.60	.60	.42	.....	.60	.....	.....	.....	.....	.....
Winchester	.60	.60	10%	25	.50	8.00	.60	.60	.50	.45	7.00	.35	5.50	7.00	4.75	6.00	4.00
WASHINGTON																	
Aberdeen	.85	1.00	Cash disc.	25	.85	14.00	.....	.....	.70	.....	.....	.....	6.50	6.00	.....	.....	.....
Everett	.80	.90	.....	25	.80	.....	1.00	.90	.80	.62	6.50	.....	6.50	6.50	6.00	.....	6.00
Spokane	1.00	1.00	.....	20	.90	.....	1.00	1.00	.90	.90	10.00	....	9.50	7.50	.....	10.00	5.50
Tacoma	.75	.90	5%	25	.60	10.00	1.00	.90	.75	.75	6.00	.40	7.00	6.00	5.50	.....	4.50
Vancouver	.80	.80	Cash disc.	25	.80	.....	.80	.70	.70	.42	.....	....	.....	.....	.....	.....	.....
Wenatchee	.....	.....	.....	..	.....	.....	.....	.....	.80	.53	6.00	.....	6.00	.....	5.00	.....	6.00
Yakima	.80	.80	No disc.	25	.70	7.00	.60	.60	.60	.60	6.50	.35	5.50	7.00	5.10	7.50	5.00
WEST VIRGINIA																	
Beckley	.75	.80	No disc.	12½	.65	.....	.80	.70	.70	.....	.....	.....	.....	.....	.....	11.00	.....
Bluefield	.70	.70	Net	25	.70	10.00	.60	.60	.60	.50	8.40	.40	7.00	.....	.....	8.00	6.00
Charleston	.70	.70	Net	25	.60	10.00	.60	.60	.60	.50	10.00	.50	6.66	9.00	.....	10.00	7.00
Huntington	.70	.70	5%	12½	.55	9.00	.60	.60	.50	.42	.....	.....	7.00	9.00	.....	.....	.....
Montgomery	...	...	.....	..	.60	6.00	.80	.80	.80	.80	16.00	.....	7.34	.....	.....	.....	6.00
Ransom	.60	.60	No disc.	10	.50	7.00	.56	.56	.55	.42	7.00	.....	4.50	.....	5.00	7.00	5.00
Williamson	.80	.80	No disc.	25	.60	8.00	.80	.70	.70	.70	.....	.....	8.00	.....	.....	.....	7.00
WISCONSIN																	
Appleton	.50	.60	.....	..	.45	.....	.60	.50	.40	...	.....	....	4.00	5.00	.....	.....	.....
Ashland	.50	.50	No disc.	50	.45	7.00	.80	.50	.40	.40	6.00	.45	6.00	6.25	.....	6.00	5.00
Green Bay	.70	.70	No disc.	25	.60	8.00	.60	.60	.60	.60	10.00	.50	5.00	7.00	7.00	7.00	.....
Manitowoc	.60	.65	No disc.	25	.50	7.00	.80	.70	.50	.50	8.00	.40	.....	4.75	4.75	.....	.....
Milwaukee	.80	.80	No disc.	25	.70	12.00	.70	.62	.60	.60	6.00	....	6.00	6.00	.....	10.00	5.00
Racine	.70	.70	No disc.	25	.60	8.00	.60	.50	.50	.50	7.20	....	.....	7.20	.....	.....	.....
Sheboygan	.80	1.00	Cash disc.	25	.72	14.40	.60	.60	.60	.60	12.00	.72	.....	12.00	.....	12.80	.....
Superior	.80	.80	No disc.	25	.75	10.00	.80	.70	.70	.53	8.00	.40	7.00	8.00	8.00	8.00	8.00
Waukesha	.80	.80	No disc.	25	....	.....	.80	.70	.70	.70	.....	.....	.....	.....	.....	.....	.....
Wausau	.60	.60	Cash dsic.	25	.40	5.00	.60	.50	.50	.50	10.00	.25	.....	12.00	.....	10.00	.....
Williams Bay	.80	.80	None	25	.80	10.00	1.00	.80	.80	.80	10.00	.50	8.00	16.00	10.00	10.00	.....
WYOMING																	
Casper	.60	.80	No disc.	25	.50	8.00	.80	.70	.60	.50	8.00	....	8.00	6.00	.....	6.00	5.00
Cheyenne	.80	.80	Cash disc.	25	.60	12.00	1.00	.80	.80	.50	.....	....	7.00	.....	7.00	10.00	5.50
Laramie	1.00	1.00	None	25	.90	14.00	1.00	.90	.90	.60	15.00	....	.....	5.00	.....	14.00	.....
Sheridan	.85	.90	None	25c	.85	14.00	.80	.70	.60	.42	6.00	....	9.00	8.00	8.00	.....	.....
Wheatland	1.00	1.00	10%	..	.90	18.00	.92	.90	.90	.90	.....	....	.....	.....	.....	.....	.....
CANADA																	
Montreal	.60	.60	No disc.	25	.40	6.00	.40	.40	.40	.40	5.00	.40	.....	6.00	.....	.....	.....
Ottawa	.55	.60	.....	25	.44	6.60	.60	.60	.60	.....	.....	.34	5.50	.....	.....	.....	.....
Toronto	.64	.64	No disc.	25	.50	7.00	.60	.60	.60	.50	9.00	.50	5.25	5.50	5.00	6.50	4.00
Vancouver	1.00	1.10	No disc.	50	.70	11.00	.80	.70	.70	.40	8.00	....	.....	6.50	.....	.....	5.00

Table I shows the average price of ice per 100 lbs and per ton in each state in the four divisions into which the country has been divided.

TABLE I—AVERAGE PRICE OF ICE PER 100 LBS. AND PER TON IN STATES BY GROUPS, 1952

State	Dom. Trade 100 lbs.	Light Commercial 100 lbs.	Heavy Commercial Per Ton	Dealers Per Ton	Car Icing Per Ton	Carload Per Ton
EASTERN STATES—69 REPORTS						
Connecticut	69.0c	59.3c	$8.50	$5.31	$9.50	$4.00
Delaware	65.2c	56.7c	9.33	6.00	7.25	4.00
Dist. of Columbia	70.0c	60.0c	9.00	6.50	9.00	.....
Maine	70.0c	57.0c	8.00	5.00	7.00	5.00
Maryland	68.1c	85.0c	8.75	6.87	5.00	4.50
Massachusetts	77.2c	59.4c	7.36	5.44	7.50	.....
New Hampshire	64.5c	55.0c	8.50	4.83	9.00	.....
New Jersey	57.5c	47.3c	5.25	5.06	5.50	5.00
New York	77.2c	65.2c	9.50	6.17	8.80	.....
Pennsylvania	68.9c	60.0c	9.08	5.89	9.05	6.00
Rhode Island	75.0c	55.0c	9.00	4.30	.....	.....
Vermont	70.0c	60.0c	8.25	6.50	.....	.....
Virginia	75.4c	60.0c	8.67	6.44	5.75	5.50
West Virginia	71.3c	60.0c	8.33	6.75	7.67	6.20
AVERAGE PRICE	69.9c	60.0c	8.39	5.79	7.58	5.02
SOUTHERN STATES—75 REPORTS						
Alabama	68.0c	59.0c	$8.50	$7.00	$8.00	$6.00
Arkansas	64.9c	58.7c	9.93	6.70	8.75	5.00
Florida	65.4c	52.0c	8.62	7.16	7.17	5.00
Georgia	67.5c	62.5c	10.00	7.00	7.25	5.67
Louisiana	62.5c	52.5c	8.30	6.86	6.35	5.00
Mississippi	67.5c	55.0c	9.33	7.00	7.00	.....
North Carolina	69.2c	65.0c	10.17	7.53	7.50	4.50
Oklahoma	76.0c	58.0c	10.40	7.42	7.00	5.00
South Carolina	70.0c	62.2c	10.50	6.09	7.29	5.50
Tennessee	65.0c	57.7c	9.60	6.67	9.50	.....
Texas	65.5c	56.8c	8.75	6.65	6.52	4.90
AVERAGE PRICE	67.4c	58.1c	9.46	6.92	7.48	5.17
MIDWESTERN STATES—89 REPORTS						
Illinois	71.0c	60.9c	$10.53	$5.96	$7.77	$5.08
Indiana	71.8c	61.8c	9.69	6.70	8.28	6.67
Iowa	70.0c	53.3c	9.71	6.75	6.00	5.50
Kansas	72.8c	64.6c	9.14	7.40	7.50	6.13
Kentucky	70.8c	58.3c	10.00	6.33	8.50	.....
Michigan	78.3c	65.8c	11.60	6.87	9.75	.....
Minnesota	75.5c	63.0c	9.33	6.02	5.67	5.00
Missouri	67.8c	55.5c	9.59	6.39	5.85	4.81
Ohio	75.8c	66.6c	10.00	7.36	10.00	6.00
Wisconsin	70.1c	51.5c	9.04	6.40	8.50	5.70
AVERAGE PRICE	72.4c	60.1c	9.86	6.62	7.78	5.61
WESTERN STATES—64 REPORTS						
Arizona	75.0c	74.3c	$7.83	$7.57	$6.75	$5.50
California	85.0c	67.5c	8.17	6.79	6.94	.....
Colorado	77.5c	60.8c	10.86	7.68	5.82	4.87
Idaho	85.0c	65.0c	10.53	7.67	4.81	4.43
Montana	85.0c	76.7c	10.00	9.75	9.90	8.85
Nebraska	69.0c	60.0c	10.25	6.95	7.50	4.25
Nevada	110.0c	100.0c	12.00	10.00	.....	.....
New Mexico	82.5c	49.0c	10.50	9.00	5.25	5.00
North Dakota	83.7c	75.0c	7.00	5.50	4.50	.....
Oregon	89.1c	90.0c	12.21	7.00	5.86	4.75
South Dakota	103.5c	79.0c	10.00	9.50	7.00	5.50
Utah	76.7c	55.0c	8.00	5.00	.....	4.50
Washington	86.7c	75.8c	10.33	6.75	6.18	5.40
Wyoming	87.5c	75.0c	13.20	8.00	6.80	5.25
AVERAGE PRICE	85.5c	72.4c	10.06	7.66	6.44	5.30

Table II presents summaries of the prices that have been compiled in Table I for ice sold at retail, for the domestic, the light commercial and the heavy commercial trade.

TABLE II—SUMMARY OF ICE PRICES PER HUNDRED POUNDS AND PER TON—1952

Section	Domestic Trade 100 lbs.	Light Commercial 100 lbs.	Heavy Commercial per ton
Eastern States	69.9c	60.0c	$8.39
Southern States	67.4c	58.1c	9.46
Midwestern States	72.4c	60.1c	9.86
Western States	85.5c	72.4c	7.66
GENERAL AVERAGE	73.8c	62.6c	$8.84

Table III presents summaries of the prices compiled in Table I for wholesale ice representing sales to dealers, car icing, and carloads.

TABLE III—AVERAGE PRICE PER TON FOR DEALERS CAR ICING, CARLOADS

	Dealer Sales Per Ton	Car Icing Per Ton	Carload Sales Per Ton
Eastern States	$5.79	$7.58	$5.02
Southern States	6.92	7.48	5.17
Midwestern States	6.62	7.78	5.61
Western States	7.66	6.44	5.30
GENERAL AVERAGE	$6.75	$7.32	$5.27

Table IV shows the average prices charged for the different classes of trade during the last seven years. These prices are illustrated in graphic form in the chart reproduced on the first page of this article.

TABLE IV—AVERAGE PRICES CHARGED FOR ICE, VARIOUS CLASSES OF TRADE, 1946–1952

	1946	1947	1948	1949	1950	1951	1952
Domestic	59.4c	64.5c	67.2c	68.5c	69.4c	73.2c	73.8c
Commercial	41.5c	47.0c	50.6c	51.3c	51.2c	53.8c	53.4c
Dealers	$5.72	$6.13	$6.04	$6.41	$6.14	$6.29	$6.75
Car Icing	5.45	5.77	6.68	6.73	6.76	6.96	7.32
Carloads	4.61	4.70	4.92	5.17	5.00	5.08	5.27

Table V gives the average price for domestic trade in different sections of the country also the grand average for the years 1942-1952 inclusive.

TABLE V—AVERAGE PRICES FOR DOMESTIC TRADE IN DIFFERENT SECTIONS—1942–1952

Year	Eastern	Southern	Midwestern	Western	Average
1942	55.9c	50.6c	53.9c	66.5c	56.7c
1943	57.2c	52.3c	55.0c	66.0c	57.6c
1944	58.5c	52.4c	55.8c	63.8c	57.6c
1945	57.5c	52.1c	56.1c	69.7c	58.8c
1946	59.4c	52.2c	56.5c	69.4c	59.4c
1947	63.3c	59.3c	60.8c	74.5c	64.5c
1948	66.9c	60.3c	65.0c	76.6c	67.2c
1949	67.2c	62.2c	66.7c	77.8c	68.5c
1950	69.4c	62.2c	66.4c	79.8c	69.5c
1951	70.3c	66.7c	70.8c	84.8c	73.2c
1952	69.9c	67.4c	72.4c	85.5c	73.8c

Table VI shows the average price received for domestic ice, wholesale ice, and all ice sold. The grand average for all ice as shown in this table is $9.49 per ton, compared to $9.08 per ton last year and $8.71 the year before.

TABLE VI—AVERAGE PRICE OF ICE—1952

	Per Cwt.	Per Ton
AVERAGE PRICE FOR DELIVERED ICE—1952		
Domestic Trade	73.8c	$14.76
Light Commercial Trade	62.6c	12.52
Heavy Commercial Trade	44.2c	8.84
GENERAL AVERAGE	60.2c	$12.04
AVERAGE PRICE FOR WHOLESALE ICE—1951		
Dealers		$ 6.75
Car Icing		7.32
Carload Ice		5.27
GENERAL AVERAGE		$ 6.45
AVERAGE PRICE FOR ALL ICE SOLD—1951		
Delivered Ice		$12.52
Wholesale		6.45
GRAND AVERAGE ALL ICE SOLD		$ 9.49

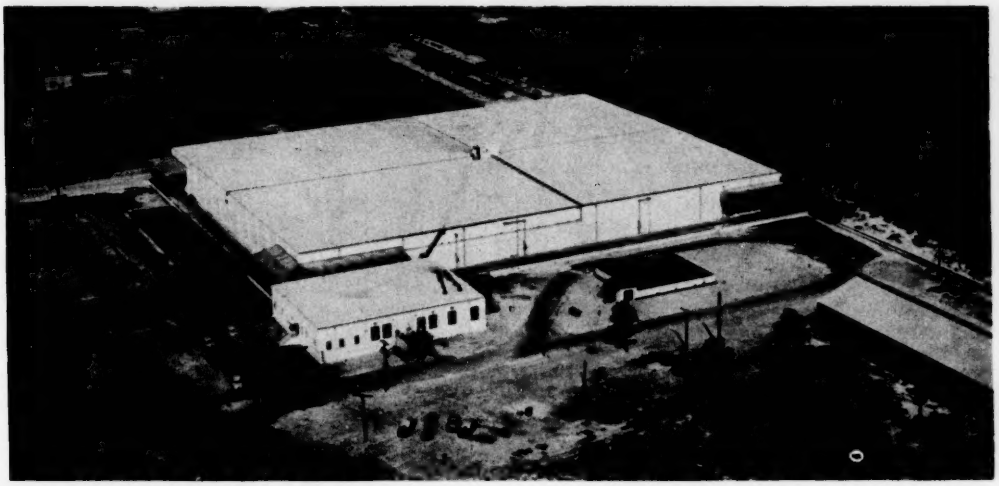
Table VII shows the range in price for the different classes of trade in various sections. As usual these prices show considerable variation in all sections, due to local conditions. The variation however, appears to show a wider spread than in previous years.

TABLE VII—RANGE OF PRICES OF DIFFERENT CLASSES OF TRADE IN VARIOUS SECTIONS

	High	Low	Diff.	High	Low	Diff.
	Eastern			Southern		
Domestic Trade	77.2c	57.5c	19.7c	69.2c	64.9c	4.3c
Light Commercial	85.0c	47.5c	37.5c	65.0c	52.0c	13.0c
Heavy Commercial	$ 9.50	$7.36	$2.14	$10.50	$8.30	$2.20
Dealers	6.87	4.30	2.57	7.53	6.09	1.44
Car Icing	9.50	5.00	4.50	9.50	6.35	3.15
Carload	6.00	4.00	2.00	6.00	4.50	1.50
	Midwestern			Western		
Domestic Trade	78.3c	67.8c	10.5c	103.5c	69.0c	34.5c
Light Commercial	66.6c	51.5c	15.1c	100.0c	55.0c	45.0c
Heavy Commercial	$11.60	$9.04	$2.56	$12.00	$7.00	$5.00
Dealers	7.40	5.96	1.44	10.00	5.00	5.00
Car Icing	10.00	5.67	4.33	9.90	4.81	5.09
Carload	6.67	4.81	1.86	8.85	4.25	4.60

In the tables showing the reports from the various cities, Canadian prices are included, but they are not shown in the above analysis. Prices reported from these Canadian points are somewhat higher than last year.

New Refrigerated Warehouse Provides Storage For Citrus Juice Concentrates



Aerial view of Central Florida Refrigerated Warehouse. Building in left foreground houses office, stand-by power and York ammonia compressors. Stand-by power is furnished by two diesels and they are there just in case a hurricane should pass that way and interrupt power facilities.

THE rapid expansion of the citrus juice concentrate industry in Florida (26 million boxes are earmarked for juice concentrate out of an expected 1951-1952 production of some 75 million boxes) has made it necessary to provide enlarged refrigerated storage space. This has been accomplished by the construction at Plymouth, Fla., of a $1,200,000 refrigerated storage warehouse by the Central Florida Refrigerated Warehouse, one of the world's largest sub-zero refrigerated storage.

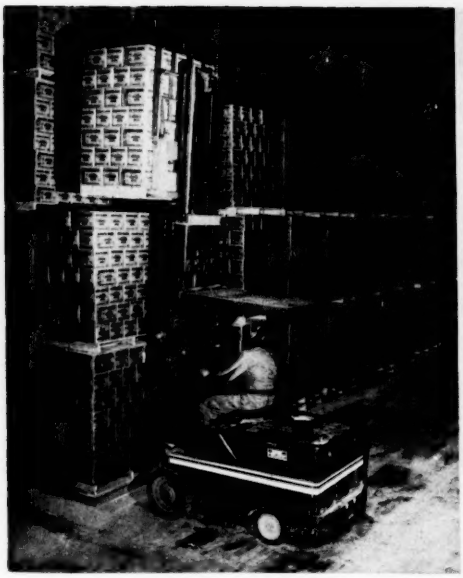
Concentrate Increases

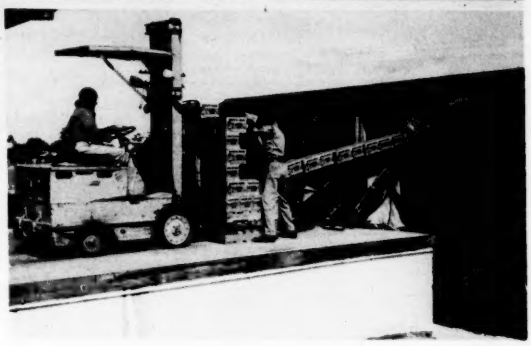
Harry Lorbach, engineer-promoter visioned the need for such a refrigerated warehouse as early as five years ago when the orange juice concentrate business was getting under way with production of some 90,000 gallons. Today the production curve has gone up to 30 million gallons annually and is still climbing.

Sprawling in a vast open tract of land, the warehouse has been built to store 6,500,000 gallons of frozen citrus juice concentrate of such fast growing companies as Minute Maid. It has been leased for ten years to the Minute Maid Corporation, which has first call on this storage capacity for its own products. Any unused space is made available to other firms in the citrus industry who have products requiring the protection of sub-zero refrigeration.

Lying within a quarter-mile of easy trucking distance from Plymouth's citrus concentrating plants, the cold storage warehouse is a low slung,

Pictured above is Chief Engineer Ross Barnett checking lubricating oil level on one of the York high speed v/w ammonia compressors in Central Florida Refrigerated Warehouse plant. Three such compressors maintain the warehouse's sub-zero temperature. A fourth high speed compressor is held in reserve in case of emergency.





Above: A load of Minute Maid concentrate is being swung into a storage space by fork lift truck, having left the processing plant only a half hour earlier. Upper right: Part of one of the freezer rooms with citrus concentrate packages. Lower right: Loading a refrigerated railroad car from fork lift truck via conveyor. Note blanket covering door of refrigerator car.

single story affair with loading ramps circling three of its four solid walls.

The flat roof was covered with a fifteen year bonded, 3-ply felt, pitch and slag roof applied over an aluminum foil vapor seal laid on a 2½ inch gyp deck placed on joists 16 inches deep. These joints support wire mesh and fiber glass mats from their undersides, forming deep interstices loaded with a blown fibre glass fill. The concrete walls are insulated with 8-inch thick cork curtain walls running from the ceiling to a point one foot below the building grade. It was found practical to lay a conventional concrete floor atop the usual sand fill at a level approximately four feet above building grade.

Refrigeration

The inside temperature is held at a constant 10 F. Refrigeration is furnished by four high stage York V/X ammonia compressors, each of eight cylinders, 3¾ x 3 in. 1200 rpm, and each provided with a sixteen cylinder 3¾ x 3 in. booster compressor, 1200 rpm, mounted in duplex, developing —26 F evaporator temperature. Condensing temperature is 95 F. Each duplex will deliver forty-five tons of refrigeration. Coils are conventional two-stage with direct expansion gas-liquid cooler. The coils are run at flooded conditions using circulating liquid ammonia.

The concentrate industry recognizes that to maintain the high quality standards required, adequate cold storage spaces will have to be provided nation-wide; first, close by the concentrate plants, then at various critical distribution points throughout the country. The Central Florida Refrigerated Warehouse established at Plymouth, Fla., is the initial and largest single effort toward achieving these goals.

Constructed by the Atlanta contractors, Mangham-Butler, Inc., the Plymouth warehouse may set the pattern for subsequent storage space assuring faster distribution plus the factor of enhanced quality for the ultimate consumer. This is the vision of Minute Maid. It is also Mr. Lorbach's, his associates', and all others closely identified with the design, installation and operation of this refrige ated storage warehouse.

Apple Juice Concentrate

A FROZEN concentrate of apple juice is the newest wrinkle in the state of Washington's apple and refrigeration industries that will combine their products to produce the new use for culls and seconds in the apple industry of the Pacific Northwest state that have been finding no markets. The new frozen apple juice concentrate will be put up through the processing and freezing facilities of the Welch Grape Juice Co. plant at Grandview, Wash.

Frozen Apple Slices

NEW freezing and refrigerated processes may be employed to market much of the state's leading fruit in Washington. The apple, most important of annual crops to this Pacific Northwest state, may be marketed in the form of "dehydrated frozen apple slices," according to the Washington State Apple Commission, concerned with the furtherance of the state's big crop in every possible guise, to remove culls and off-color and other types slow to move.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices
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Executive Vice-president
WM. DALTON, WASHINGTON, D. C.

Secretary
JOS. H. COLQUITT, WASHINGTON, D. C.

Director of Information
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Treasurer
C. E. SIMMON, OKLAHOMA CITY, OKLA.

THIS MONTH IN BRIEF

Revised Trade Practice rules, effective April 4, 1952, have been promulgated by the Federal Trade Commission.

A study compiled by a Committee on Materials Handling presents pointers on selecting the proper size of pallets, construction that will insure long life and other specifications together with pointers on proper care, maintenance and repair.

Utilization of public cooler space in refrigerated warehouses on March 31 showed an increase of two points over last month, but a decrease of one point from a year ago. Frozen occupancy declined four points during March.

A million and a half dollar refrigerated warehouse will be constructed at Memphis, Tenn., by The Mid-South Refrigerated Warehouse Company. Grading operations started early in February.

Trade Practice Rules Adopted For the Public Refrigerated Warehousing Industry

FOLLOWING publication in the February, 1951, issue of ICE AND REFRIGERATION of proposed revised trade practice rules for the public refrigerated storage industry, the Federal Trade Commission has promulgated the final draft, the full text of which follows:

The industry is composed of persons, firms, corporations and organizations engaged commercially in the business of providing cold storage facilities and public refrigerated warehouse space for the storage of fruits, vegetables, and other products received and awaiting re-shipment to final destination in the course of commerce and for which it issues warehouse receipts and furnishes certain other services incidental thereto. According to available information, there are over seven hundred public refrigerated warehouses which are valued at approximately a billion dollars and which provide more than 450,000,000 cubic feet of refrigerated warehouse space.

The rules constitute a revision of those promulgated for the industry on November 9, 1931. Numerous changes embodying clarification of the applicable requirements of laws administered by the Commission have been made.

Primary objectives of the rules are the maintenance of free and fair competition in the industry and the elimination and prevention of unfair methods of competition, unfair acts or practices, and other trade abuses. They are to be applied to such end and to the exclusion of any acts or practices which suppress competition or which otherwise restrain trade. The rules are designed to meet particular needs of the industry and should not be construed as covering all acts or practices prohibited by the laws administered by the Commission, nor as affecting the application of the "United States Warehouse Act" of 1916 as amended, or of any State or municipal statute or ordinance relating to the issuance of warehouse receipts or any other phase of the business of public refrigerated storage.

Proceedings to revise the trade practice rules as previously promulgated for this industry were instituted upon application made by industry members. A draft of a proposed revision of such rules, prepared in cooperation with industry representatives, was discussed at a trade practice conference held in Chicago, Illinois. Subsequently, proposed rules in appropriate form were published by the Commission and made available to all industry members and other interested or affected parties upon public notice whereby they were afforded opportunity to present their views, including such pertinent information, suggestions, amendments or objections as they desired to offer, and to be heard in the premises. Pursuant to such notice, the public hearing was held in Boston, Massachusetts, and all matters there presented, or otherwise received in the proceeding, were duly considered.

Upon consideration of the entire proceeding, the Commission approved and received, respectively, the Group I and Group II Rules as hereinafter set forth.

Such rules become operative thirty (30) days from the date of their promulgation.

THE RULES

These rules promulgated by the Commission are designed to foster and promote the maintenance of fair competitive conditions in the interest of protecting industry, trade, and the public. It is to this end, and to the exclusion of any act or practice which suppresses competition, restrains trade, fixes or controls price through combination or agreement, or which otherwise injures, destroys, or prevents competition, that the rules are to be applied.

THE INDUSTRY DEFINED

This industry is engaged commercially in the business of providing cold storage facilities and public refrigerated warehouse space for the storage of fruits, vegetables, and other products received and awaiting reshipment to final destination in the

course of commerce and for which it issues warehouse receipts and furnishes certain other services incidental thereto.

GROUP I

The unfair trade practices embraced in the Group I rules herein are considered to be unfair methods of competition, unfair or deceptive acts or practices, or other illegal practices, prohibited under laws administered by the Federal Trade Commission; and appropriate proceedings in the public interest will be taken by the Commission to prevent the use, by any person, partnership, corporation, or other organization subject to its jurisdiction, of such unlawful practices in commerce.

RULE 1—DECEPTIVE ISSUANCE OF WAREHOUSE RECEIPTS.

It is an unfair trade practice for any member of the industry to issue, or cause to be issued, warehouse receipt which, to the knowledge of the industry member, or under such circumstances as are reasonably calculated to impute knowledge to the industry member, is false, misleading, or deceptive in any material respect.

Among the practices inhibited by this rule are:

(a) Issuing warehouse receipts without having actual control of the products for which the receipt is issued.

(b) Issuing negotiable warehouse receipts for goods of which the issuer is part or sole owner without full and nondeceptive disclosure of that fact.

RULE 2—DELIVERING GOODS WHEN NEGOTIABLE WAREHOUSE RECEIPT IS OUTSTANDING AND UN-CANCELED.

It is an unfair trade practice to make any member of the industry to deliver part or all of any lot of stored products for which a negotiable warehouse receipt (the negotiation of which would transfer the right to the possession of such products) has been issued and is outstanding and uncanceled, without obtaining the possession of such receipt, or taking up and canceling the same, or placing plainly upon it a statement of what products have been delivered, at or before the time of the delivery of such products, except where delivery thereof is made pursuant to an order of a court of competent jurisdiction or in compliance with a sale made to satisfy a lien thereon, or in accordance with State or local regulations or ordinances, with the capacity and tendency or effect of misleading or deceiving purchasers or prospective purchasers.

RULE 3—DECEPTION (GENERAL)

It is unfair trade practice to make or publish, or cause to be made or published, directly or indirectly, any false, misleading, or deceptive statement or representation, by way of advertisement, depiction, or in any other manner having the capacity and tendency or effect of misleading or deceiving purchasers or prospective purchasers, with respect to the quality, character, utility, effectiveness, or nature of any public refrigerated space or facilities or services incidental thereto.

RULE 4—COMMERCIAL BRIBERY.

It is an unfair trade practice for a member of the industry, directly or indirectly, to give, or offer to give, or permit or cause to be given, money or anything of value to agents, employees, or representatives of customers or prospective customers, or to agents, employees, or representatives of competitors' customers or prospective customers, without the knowledge of their employers or principals, as an inducement to influence their employers or principals to purchase, rent, or contract to purchase or rent, public refrigerated space or facilities or services incidental thereto from such industry member or the maker of such gift or offer, or to influence such employers or principals to refrain from purchasing or renting public refrigerated space or facilities or services incidental thereto from competitors or from dealing or contracting to deal with competitors.

RULE 5—SELLING BELOW COST.

The practice of selling or furnishing public refrigerated space or facilities, or services incidental thereto, at a price less than the cost thereof to the seller or furnisher, with the purpose or intent, and where the effect may be, to injure, suppress, or stifle competition or tend to create a monopoly in this industry, is an unfair trade practice. As used in this rule, the term "cost" means the total cost to the seller or furnisher of any such transactions of sale or rental.

This rule is not to be construed as prohibiting all sales below cost, but only such selling below the seller's cost as is resorted to and pursued as a monopolistic practice with the wrongful intent referred to and where the effect may be unreasonably to restrain trade, tend to create a monopoly, or substantially lessen competition.

All elements recognized by good accounting practice as proper elements of such cost shall be included in determining cost under this rule. The costs referred to in the rule are actual costs of the respective seller and not some other figure or average costs in the industry determined by an industry cost survey or otherwise.

RULE 6—INDUCING BREACH OF CONTRACT.

Knowingly inducing or attempting to induce the breach of existing lawful contracts between competitors and their customers or their suppliers, or interfering with or obstructing the performance of any such contractual duties or services, under any circumstance having the capacity and tendency or effect of substantially injuring or lessening present or potential competition, is an unfair trade practice.

Nothing in this rule is intended to imply that it is improper for any industry member to solicit the business of a customer of a competing industry member; nor is the rule to be construed as in anywise authorizing any agreement, understanding, or planned common course of action by two or more industry members not to solicit business from the customers of either of them, or from customers of any other industry member.

RULE 7—DEFAMATION OF COMPETITORS OR FALSE DISPARAGEMENT OF THEIR BUSINESS.

The defamation of competitors by falsely imputing to them dishonorable conduct, inability to perform contracts, questionable credit standing, or by other false representations, or the false disparagement of the business of competitors in any material respect, or of their business methods, selling prices, values, credit terms, policies, or services, is an unfair trade practice.

RULE 8—PROCUREMENT OF COMPETITORS' CONFIDENTIAL INFORMATION BY UNFAIR MEANS AND WRONGFUL USE THEREOF.

It is an unfair trade practice for any member of the industry to obtain information concerning the business of a competitor by bribery of an employee or agent of such competitor, by false or misleading statements or representations, by the impersonation of one in authority, or by any other unfair means, and to use the information so obtained in such manner as to injure said competitor in his business or to suppress competition or unreasonably restrain trade.

RULE 9—PROHIBITED FORMS OF TRADE RESTRAINTS (UNLAWFUL PRICE FIXING, ETC.)

It is an unfair trade practice for any member of the industry, either directly or indirectly—

(a) to enter into or take part in any understanding, agreement, combination, or conspiracy, or any planned common course of action, with one or more members of the industry, or with any other person or persons, unlawfully to fix, maintain, or enhance the price of any goods, or otherwise unlawfully to restrain trade; or

(b) to use any form of threat, intimidation, or coercion to induce any member of the industry, or other person or persons, to become a party to any such understanding, agreement, combination, or conspiracy, or any such planned common course of action.

RULE 10—AIDING OR ABETTING USE OF UNFAIR TRADE PRACTICES.

It is an unfair trade practice for any person, firm, or corporation to aid, abet, coerce, or induce another, directly or indirectly, to use or promote the use of any unfair trade practice specified in these rules.

GROUP II

Compliance with trade practice provisions embraced in Group II rules is considered to be conducive to sound business methods and is to be encouraged and promoted individually or through voluntary cooperation exercised in accordance with existing law. Nonobservance of Group II rules does not per se constitute violation of law. Where, however, the practice of not complying with such rules is followed in a manner that will result in unfair methods of competition or unfair or deceptive acts or practices, corrective proceedings in respect thereto may be instituted by the Commission as in the case of violation of Group I rules.

RULE A—PUBLISHING OF RATES AND CHARGES.

The industry approves the practice of each individual member independently establishing and openly stating and publishing his rates and charges with applicable terms and conditions.

RULE B—EXCESSIVE EXTENSION OF CREDIT AND UNSOUND COLLATERAL OR UNSECURED LOANS.

Reasonable extension of credit and the making of secured loans at prevailing interest rates to storers and customers is normal warehouse business. However, extending excessive credit, and making or offering to make collateral or unsecured loans not in conformity with current sound banking principles, are condemned by the industry.

RULE C—DISSEMINATION OF CREDIT INFORMATION.

The industry records its approval of distributing to its members information covering delinquent and slow accounts in so far as this may lawfully be done.

INDUSTRY COMMITTEE

A Committee On Trade Practices is hereby authorized to cooperate with the Federal Trade Commission and to perform such acts as may be legal and proper in the furtherance of fair competitive practices and in promoting the effectiveness of the rules.

Promulgated by the Federal Trade Commission April 4, 1952.

D. C. DANIEL, Secretary.

Company Publications - Their Place in The Warehousing Industry

TO keep in closer touch with the office and working staff and to help them understand the problems and policies of the company and to lead to a wider acquaintance with their associates, a number of refrigerated warehouses issue regular company publications. These are the "internal" type, that is they are published primarily for circulation among the employees and executive staff.

"Scobeyviews", is issued monthly by The Scobey Fireproof Storage Co., San Antonio, Texas. Typical is the February 1952 issue, which starts with a personality sketch of Robert E. Jacobs, superintendent of Scobey Warehouse No. 6, followed by a news note on plant improvements, other short personality sketches, comments by employees, a message from J. H. Eagleston, manager of the Warehouse Division; a list of foods that make for better health (mostly storage products); jokes, some of which are illustrated; personals telling about vacation trips, births, deaths and grandchildren; and the last page has timely comments on economical driving habits, illustrated.

News Letter

The Merchants Cold Storage Co., Minneapolis, Minn., issues a "News Letter" as a combination internal and external organ, that is, it is circulated among both employees and customers. In it is carried pertinent facts and comments, like an advertisement or a news story in a newspaper. It is put out at no particular time, only when it is felt that there is something important to announce.

The two plants of C. A. Swanson & Sons. Omaha, Nebr., one at Salisbury, Md. and one at Fayetteville, Ark., have small bi-weekly bulletins for employees, made up mostly of news notes and personal news items.

The "U. S. Sno-Man" is issued in small newspaper tabloid form by the United States Cold Storage Corp. Its four pages are made up of general news notes of interest to the warehousing industry; personal news items; and following the trend of newspaper style, a columnist who comments on a wide range of subjects, humorous and serious.

The "Crystal Gazer" is issued by the Crystal Ice & Cold Storage Co., Sacramento, Calif. The February 1952 issue, selected as typical, starts off with short editorial comments on providing warehouse service to frozen food ditributors and innovations in handling procedures; and continues with an announcement of the 1952 safety contest; news of the company for the company personnel; editorial on the strength obtainable in unity and a few "fillers" of jokes and short comments.

In lieu of a company publication, Terminal Refrigerating and Warehouse Corp., Washington, D. C., issues an employee handbook to all employees. This is a printed and attractively bound pamphlet describing the company and its operations, giving the rules and regulations under which all employees work, their privileges including longevity pay, maternity benefits, sick leave, social security and other benefits.

A similar device, although designed primarily for "external" distribution, is used by the Great Lakes Terminal Warehouse Co., Toledo, Ohio, which distributes a pamphlet with full description of the facilities and warehouse operation, a map showing Toledo in relation to the rest of the country, an exterior and a number of interior views of the warehouse and listing some of its advantages that would appeal to customers.

The Cincinnati Warehouse Terminal, Inc., Cincinnati, Ohio, have a number of pamphlets and other literature describing its plant and facilities. A double post card is illustrated on one side and on the other is listed the more pertinent facts about the warehouse and its facilities. A four-page broadside repeats this information in different forms with pictures. Other broadsides give the same information in different forms.

The Wisconsin Cold Storage Company, Milwaukee, Wis., doesn't have a company publication principally because they have never considered themselves quite large enough to justify the time and money one would cost; however, they do hold informal group meetings with warehouse workers and engineers to talk over mutual problems and they feel that these personal group meetings are better than company publications, where the groups are small enough to work with in informal meetings.

The Manhattan Refrigerating Company, New York, does not have a company publication, but better employee-management relations are expanded through plant or industry council meetings at each of the two plants every two weeks.

Insurance and Safety Committee Meets

THE organization and work of the Insurance and Safety Committee of the National Association of Refrigerated Warehouses was discussed at a special meeting of the committee February 14. It was agreed that the work of this committee naturally falls into three parts—(1) Insurance, (2) Engine Room Safety and (3) Warehouse Operations Safety. To work out details and guide the work of each of these phases, Chairman Janney has appointed the following subcommittees: Warehouse Operations Safety: A. R. Carstensen, B. L. Bertel and F. D. Newell, Jr. Engine Room Safety: Walter Bernd, J. C. Irwin and Van Rensselaer H. Greene. Insurance: Gordon Janney, Jack H. McGoldrick and R. N. Tuller. Specific assignments for each of these subcommittees are now being worked out.

United States Cold Storage Reports Increased Income

THE United States Cold Storage Co., operating refrigerated warehouses in Chicago, Kansas City and Omaha, reported 1951 income increased from $3,621,404 to $3,942,819. Sales of egg products, ice and beverages were $3,890,568 against $3,362,894 according to E. M. Dodds, president.

The company obtained a 2¼ million dollar loan, secured by the Chicago, Kansas City and Omaha properties, using $950,000 to retire a previous loan and the balance together with $400,000 from working capital will be used to pay for a new unit at Omaha. Storage occupancy was high at all of the plants in most of 1951 and continues high this year, Mr. Dodds said.

Refrigeration Makes Better Foods Available

A RELEASE to which was attached a copy of the new brochure, "Why We Eat Better" has been issued in Washington to all industry and customer publications. In part, the release states: "Public refrigerated warehouses, the association says, are the key link in the chain of distribution through which perishable foods reach the family table. N.A.R.W. attributes the rich, varied diet of today's average American family to scientific advances in the refrigeration process."

North Atlantic Chapter Spring Meeting

THE spring meeting of the North Atlantic Chapter of the National Association of Refrigerated Warehouses was held at the Hotel Warwick, Philadelphia, Pa., March 27 and 28, 1952.

Seventy members and guests attended the two-day meeting which was presided over by the newly elected Chairman, C. Bartlett Eddy, of Providence, R. I. In addition to some very interesting industry discussions, the members enthusiastically received presentations offered by the following speakers:

Paul D. Burrill, Quincy Market Cold Storage Co., Boston, Mass.

William Dalton, Executive vice-president of the N.A.R.W., Wash., D. C.

Charles E. Eells, Union Terminal Cold Storage Co., Inc., Jersey City, N. J.

Harold C. Emerson, Cumberland Warehouse Corp., Bridgeton, N. J.

Jerry P. Johnson, Terminal Refrigerating & Warehousing Corp., Wash., D. C.

Horace W. Wilson, Quaker City Cold Storage Co., Inc., Phila., Pa.

J. R. Shoemaker, Hygeia Refrigerating Co., Elmira, N. Y.

Charles Size, North American Insurance Co., Phila., Pa.

Resolutions honoring Jerry P. Johnson, N.A.R.W. President, and William Dalton, Executive vice-president of the N.A.R.W., for outstanding achievement were unanimously adopted by the Chapter.

The next meeting of the North Atlantic Chapter will be held at the Whiteface Inn, Lake Placid, N. Y., September 18 to 21, 1952.

Northwest Warehousemen Arrange Meetings

THE Northwest group of refrigerated warehousemen has arranged a series of monthly meetings in the various cities represented by the members. A meeting was held February 22 at the Radisson Hotel, Minneapolis. Revision of the monthly Minnesota Cold Storage report form was the principal topic of discussion.

Warehousemen on hand for the occasion were: L. G. Bednar, St. Paul; George L. Gross and Mr. Rudolph, Duluth; F. D. Newell, Jr., Minneapolis; L. L. Oldham, Minneapolis; J. B. Frane and Mr. Neylon, Hopkins, Minn.; Archie Johnson, St. Paul; Vern Howard, Minneapolis; Robert Bratnober; B. L. Bertel, Fargo, N. D.

Johnson Wants Price and Wage Controls Discontinued

IN A strongly worded statement, addressed to Chairman Maybank of the Senate Banking and Currency Committee, NARW President Jerry Johnson recently spoke out against continuance of Price and Wage Control provisions of the Defense Production Act. "NARW believes that the basic rule of industry should be 'Do not harm the war effort.'" Mr. Johnson's statement read, "but it likewise believes that the civilian economy is endangered by the costly and complex price and wage controls now being administered."

"We are unalterably opposed to the continuance of the Price and Wage control provisions, especially as they concern service organizations. Rates for our services are dictated by competition, not by demand for our facilities. A high competitive condition naturally keeps rates in line. There seems to be no logical reason for the continuance of control of the public refrigerated storage industry.

Christensen Joins Quincy Market

PAUL B. CHRISTENSEN, for a number of years vice-president and chief engineer of Merchants Refrigeration Company in New York has become associated with the Quincy Market Cold Storage & Warehouse Company of Boston. He will manage a new cold storage warehouse now being built in Portland, Maine, which will be a subsidiary corporation of the Quincy Company and will be ready for operation July 1.

Mr. Christensen served last year as president of the American Society of Refrigerating Engineers and has been active in society affairs for many years. Before joining Merchants Refrigerating he had been with Kroger Grocery and Cincinnati Union Terminal. He has been active in many activities of the cold storage industry and represented ASRE at the International Refrigeration Congress in London.

Central Cold Storage Report

THE Central Cold Storage Co., Chicago, in 1951 earned $256,810, or $2.75 a share, as compared with $401,197, or $4.30 a share, in the preceding year, J. W. Fox, president, reported. Mr. Fox pointed out that butter and eggs were in lighter volume last year, and apples, formerly an important item for the company, are now generally being stored nearer points of production.

BUYING AND CARING FOR PALLETS

Pointers on selecting proper size of pallets, construction that will insure long life, other specifications, and proper supervision of care and maintenance and repair

This is a review of a study compiled by the committee on materials handling of the Merchandise Division, American Warehousemen's Association. While the study was directed primarily to pallets in merchandise warehouses, the requirements of which differ in some details from those of refrigerated warehouses, the basic problems are similar, hence many of the ideas presented are applicable to both branches of the warehousing industry. One point of difference is that larger and heavier pallets may be used in merchandising warehouses. On this point, specifications and sizes of pallets designed for refrigerated warehouse use were given in one of the series of articles by D. O. Haynes in the November 1947 issue of ICE AND REFRIGERATION. In that article, pallets 36 x 48 inches and 24 x 48 inches were recommended as standard.

IN connection with modern materials handling devices commonly in use these days in the public warehousing business, the wooden pallet has come to be an essential piece of warehousing equipment. Because there is an appearance of simplicity in design and construction of pallets, manufacture of them has become widespread and, in some instances, haphazard and because of a lack of technical information, some warehousemen have learned "the hard way" that there is a big difference between a good pallet and a bad one. Recognizing this situation, the Committee on Materials Handling of The American Warehousemen's Association has made a study of the purchase, care and maintenance of pallets. Following is the complete text of the committee's report.

Purchase of Pallets

The first step in the purchase of pallets is to determine what size is required for the operation. The most important factors governing this decision are (1) the size that gives the most effective use of warehouse space, and (2) the size that offers maximum utilization of pallet space according to the general type of freight to be stored on the pallet. There are other factors affecting the choice, such as the width of doorways and aisles, and elevator size. In the last few years there has been an increase in shipment of palletized merchandise, and in this respect the 40x48 inch pallet has evolved as being as near to a standard-sized pallet as any other. This size fits into railroad cars and motor trucks, and generally takes a good block of most warehoused items. The 32x40 inch pallet, also, is considered a standard-sized pallet, particularly for smaller commodities, such as grocery items.

It is recommended that one standard pallet be adopted if at all possible. The advantages inherent in having all of the pallets the same size may be specifically listed as follows:

1—Pallet cost reduced.

2—Control of pallets simplified.

3—Cost of accumulation for reserve pallets reduced.

4—Cost of pallet maintenance reduced.

5—Better utilization of warehouse space.

6—Improvement in orderliness and good housekeeping.

However, if it is found necessary to have more than one size of pallet, it is recommended that each size be identified by a different-colored paint marking. In this way, accumulation and inventorying of pallets are facilitated, and housekeeping can be better maintained.

Specifications

The second step in purchasing pallets is the inclusion of adequate specifications in the purchase order:

(1) Lumber should be hard wood with a moisture content of not more than 19 percent.

(2) Pallet boards should be free of all defects that would materially weaken them, and no board should have a knot wider than one-third of the width of the board.

(3) Deck boards should be not less than 4 inches in width, and the end deck boards of the pallet should be a minimum of 6 inches. Thickness of deck boards may vary according to the size of the pallet, but, as a general rule, should not be less than 1 inch in pallets of less than 15 square feet. For the large 48x72 inch pallet, deck boards should be a minimum of 1¾ inches. These thicknesses should be specified as the thickness after the board has been dressed. All deck boards should be dressed on the upper surface of the board. The thickness of the deck boards is very important, and particular care should be afforded to this detail in the purchase order to insure that the right thickness is specified. A difference of ¼ inch may well mean the difference between a good and a bad pallet.

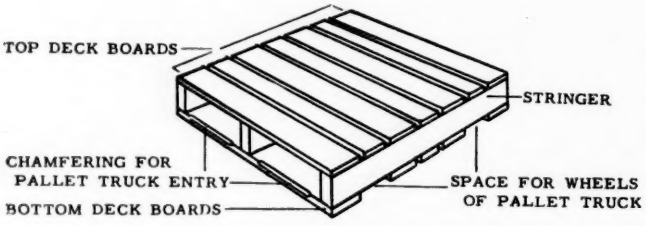
(4) There should be no more than a 2-inch space between deck boards.

(5) Stringers of a pallet of less than 15 square feet in area should be no less than 2x4 inches and on the larger-sized pallet should be a minimum of 4x4 inches.

(6) It is worth while to consider rounding the corners of outside boards to reduce accidents and damage, although this will increase the cost.

(7) Nails should be cement-coated, helix drive-screw and usually ½ inch longer than the thickness of the deck board that the nail penetrates. For longer life on smaller pallets and mandatory in the larger pallets, bolts should be used to attach the end deck boards. A ⅜-inch diameter carriage bolt with a T-nut is recommended, with the length depending upon the over-all depth of stringer and the thickness of deck boards, and making the bolt and nut flush with both deck boards. All deck boards should be securely fastened. Where nails are used to fasten deck boards, it is worth while to consider reinforcing the deck boards with 1-inch, 20-gauge, steel strapping. This tends to reduce breakage and repairs, and is particularly

helpful on the end boards, which are usually the first ones to pull out. Bands of steel strapping can also be tensioned over the pallet top and around the stringers, and stapled in place. This complete strapping is more effective than the afore-mentioned strip strapping and will help to keep nails from pulling loose, prevent splitting of boards, hold the boards tight to the stringers, and keep pallets rigid and free from distortion caused by dropping the pallet on its corners.



Construction details of wooden pallet

(8) Where hand or motorized pallet trucks are used, the bottom end deck board should be chamfered to allow ready passage of the wheels over this board. It is particularly important to see that there is enough chamfering, as difficulty in the passage of the wheels over the board often tends to make the operator force the machine, resulting in broken boards. Openings in the lower face of the pallet to allow wheels of hand or motorized pallet trucks to drop through to the floor should be approximately 7 inches. Bottom deck boards, as with top deck boards, should be no less than 4 inches in width, and end boards no less than 6 inches.

(9) In the case of four-way pallets, allowances must be made for openings in the stringers to allow passage of forks.

As stated, specifications of pallets must be carefully written as the first step in obtaining a good pallet. However, in addition to adequate specifications, care must be taken to choose the right manufacturer. Pallet manufacturing is a very competitive business, and one must make certain, where a bidder presents a low price, that he can fulfill his promise to carry out these specifications and live up to the delivery requirements. In any large order of pallets, it is worth while to consider more than one source of supply so as to maintain a better check on the manufacturer for the specified requirements.

Specifications mean nothing if, upon receipt of pallets, inspection is disregarded. A competent individual, fully acquainted with what the specifications actually mean, should thoroughly inspect each and every shipment of pallets received for any default in the required specifications. If at all possible, it is recommended that the actual manufacturing of the pallets be inspected to insure further that the specifications are being followed. With the considerable investment made in pallets, the importance of specifications and inspection can readily be realized.

Care of Pallets

No matter what the specifications for pallets may be, the way to insure getting full value is to see that the pallets are properly cared for. This is an operating problem and not a maintenance one. Unless properly supervised, warehouse laborers treat pallets as if they were dunnage rather than pieces of equipment. Several steps can be taken to minimize breakage, but the best insurance is constant supervision of the handling of pallets:

(1) Reserve piles of pallets should be low enough so that a man removing a pallet from the stack does not have to let it drop from a height that tends to split a stringer or knock the pallet out of line.

(2) Where pallets are loaded, hammers should be handy so that, before loading, any loose nails can be hammered tight. This does not involve a maintenance job, but merely means a few taps of a hammer to correct the situation, which, if neglected, will involve replacement of boards in the future. Furthermore, such scrutiny of pallets before loading reduces the possibility of damage to merchandise loaded on the pallet.

(3) Heavy merchandise, particularly drums, if dropped on pallets, will break deck boards easily. It is just as fast an operation to place a drum on a pallet carefully as it is to drop it, if a man is correctly trained and supervised.

(4) There is no necessity for dragging or pushing loaded pallets. This tends to weaken the structure of the pallet and cause eventual breakage of boards.

(5) Fork truck operators, if they are not trained properly, can very easily damage end boards in picking up or placing a pallet. Sometimes this damage can be attributed to poor lighting or crowded, narrow aisles, but proper instruction and continual supervision of fork truck operators can eliminate, to a great extent, this source of damage to pallets.

Maintenance of Pallets

The primary step in the maintenance of pallets is a supervisory one. "Bad order" pallets must be segregated promptly and sent to the maintenance shop without delay. An accumulation of damaged pallets can mount rapidly; and unless there is constant repair, there may soon be a shortage of usable pallets.

There is no particular problem in the maintenance of pallets except to insure that a proper supply of repair materials is constantly on hand. Deck boards for replacements can be purchased cut to size, and it is worth while to consider the pre-drilling of these boards for ready entry of a nail. It sometimes happens that there is difficulty in repairing pallets, particularly with hard wood, because of nails bending. The drilled holes eliminate this difficulty. As recommended in the suggested specifications for new pallets, helix drive-screw nails should be used for repairs.

In repairing broken pallets, it is advisable to make it a rule always to remove and replace split boards. Pallets with split boards re-nailed into place usually make a quick return to the repair shop—sometimes with additional damage. It may be said also that it is usually uneconomical to attempt repair of a pallet on which the stringers are split.

Oldest Public Warehouse

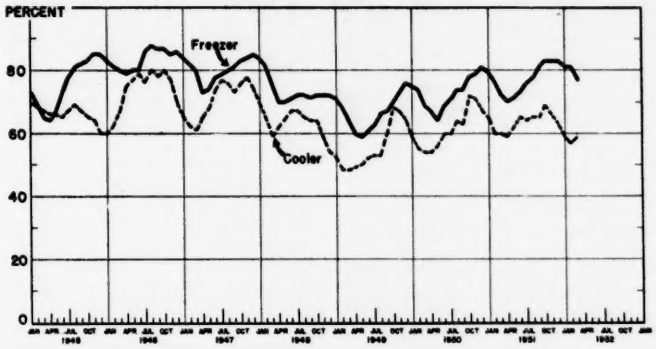
THREE-quarters of a century of business existence; that's the proud record which Hazlett Warehouse Company of San Francisco has chalked up. The respect and admiration which the industry holds for this fine old company has been well earned and is well deserved. NARW members salute the management and employees of Hazlett and wish them many more years of active and useful service.—NARW Cold Facts.

March 31 Cold Storage Holdings

UTILIZATION of public cooler space was 59 percent on March 31 as compared with 60 percent last year and 56 percent reported for the 5-year period ended 1951. The two point increase reported by the end of March compares with an expected two point decline indicated by the 5-year average February to March change, and marks the first time since 1946 that cooler occupancy increased during March. Not all areas shared in this increase as occupancy in the New England and East North Central areas decreased during this period. The largest gains were reported in the Mountain and Pacific regions, 11 and 7 points, respectively.

Freezer occupancy declined four points during March to 77 percent and by the end of the month was five points above average and the level of a year ago. Despite a seasonal decline, freezer occupancy continued at a high level in the East and West North Central and Mountain regions where March 31 occupancy was reported to be 85, 91, and 88 percent, respectively. In the Middle Atlantic region, freezer occupancy fell off to 74 percent and on the West Coast, occupancy was only 68 percent. City-wise, freezer occupancy was above 85 percent in Chicago, Minneapolis, St. Louis, Baltimore, Norfolk, Memphis, New Orleans, Los Angeles, and San Francisco.

A 15 percent net reduction in cooler weights brought national stores of foodstuffs in coolers down to 1.4 billion pounds. This compares with 1.8 billion in store last year and 1.5 billion in store March 31 during the 5-year period ended 1951. During March, net withdrawals of 239 million pounds were reported in cooler stored commodities most of which were accounted for by the seasonal declines of fresh fruits, cheese, dried eggs, and selected meat items. Freezer stores, likewise, declined during March and by the end of the month the national total was 2.3 billion pounds. The total net freezer reduction of 60 million pounds was primarily frozen fruits, vegetables, poultry and dairy products which reflected greater seasonal net withdrawals than the contra-seasonal increase in meat storage stocks. Total weight in freezer storage exceeded average March 31 stocks by over 600 million pounds and was 489 million pounds above holdings last year.



Occupancy of Refrigerated Warehouses, 1945-1952

Seasonal reductions in frozen fruit stocks left 236 million pounds in store by the end of March as compared with 245 million last year and 247 million on hand during the 5-year period ended 1951. The March net withdrawals of 5 million bushels of apples brought national stores down to 6 million by March 31 which were about half the amount in store last year this time and about a third less than average March 31 stocks. By the end of last month, pears remaining in storage totaled 141,000 bushels or about half the amount on hand the previous month.

Net withdrawal of 31 million pounds was 8 million pounds less than the net withdrawal last year and 5 million less than average.

Strawberry stocks down to 58 mil-

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Mar. 31, 1952	Feb. 29, 1952	Mar. 31, 1951	Five-year Average
Meat and meat products, lbs.	1,236,834	1,209,783	905,946	852,113
Lard and rendered pork fat, lbs.	68,702	53,816	78,352	112,145
Frozen poultry, lbs.	233,482	270,397	192,913	192,388
Creamery butter, lbs.	6,157	7,879	33,378	28,897
American cheese, lbs.	132,882	142,945	130,655	108,087
Other cheese, lbs.	14,052	15,806	18,736	15,337
Shell eggs, cases	1,603	942	309	762
Frozen eggs, lbs.	84,444	60,576	62,298	99,627
Apples, bu.	6,047	10,753	12,891	8,659
Frozen fruits, lbs.	235,999	267,022	245,331	247,283
Frozen vegetables, lbs.	349,887	398,699	294,223	248,598
Frozen fish, lbs.	113,499	125,704	96,367	84,241

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Mar. 31, 1952 (%)		Feb. 29, 1952 (%)		Mar. 31, 1951 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	2,672	5,516	43	78	45	81	54	76	49	68
Middle Atlantic	36,062	34,140	55	74	54	80	58	73	51	71
East North Central	28,669	26,196	60	85	61	86	66	76	59	74
West North Central	8,833	15,322	66	91	63	90	65	84	66	82
South Atlantic	8,339	7,147	62	81	60	84	54	78	59	78
East South Central	3,620	3,754	66	69	65	87	64	77	68	80
West South Central	6,640	6,868	63	61	63	63	62	60	65	66
Mountain	1,487	2,510	78	88	67	91	68	67	68	77
Pacific	14,223	23,072	56	68	49	71	53	61	53	64
United States	110,547	124,524	59	77	57	81	60	72	56	72

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent				Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent			
			Mar. 31, 1952		Feb. 29, 1952				Mar. 31, 1952		Feb. 29, 1952	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	.....	.....	..	..	50	50	.....	.....	..	..	..	..
Middle Atlantic	1,610	1,191	36	57	39	73	1,358	247	85	84	82	86
East North Central	3,847	5,398	65	77	73	56	5,183	1,109	87	93	86	96
West North Central	267	1,257	44	51	74	75	5,370	3,979	90	94	90	94
South Atlantic	545	3,017	43	78	66	69	483	16	73	100	74	100
East South Central	.....	.....	..	..	..	..	115	70	100	87	93	93
West South Central	259	227	56	79	85	90	400	160	100	100	100	100
Mountain	10	203	29	84	..	20	.....	.....	..	..	..	..
Pacific	2,998	2,275	24	35	29	58	667	284	93	93	100	98
United States	9,536	13,568	45	66	52	65	13,576	5,865	89	93	88	95

NOTE:—Blank spaces indicate that insufficient returns were received.

lion pounds by March 31 reflected a net withdrawal of 13 million pounds. The next greatest withdrawal was reported in stocks of cherries which fell off to 43 million pounds. Lesser reductions were reportd in the other frozen fruit items. Orange juice stocks increased approximately 4 million gallons to 19 million by March 31.

Frozen vegetables on hand by the end of last month were reduced to 350 million pounds, a net reduction of 49 million since February. This net change compares with 34 million reported last year and 29 million withdrawn during March for the 5-year period ended 1951. A 17 million pound net reduction in frozen pea stocks brought the national total down to 80 million pounds; lima beans were reduced to 55 million; snap beans to 36 million.

Only a little more than 6 million pounds of butter were reported in storage by the end of last month as compared with 33 million last year and 29 million on hand March 31 during the 5-year period ended 1951. Approximately half of all the butter in storage were in the Middle Atlantic and West North Central regions.

Cheese stocks were reduced by twice the average amount during March—12 million vs 6 million—and by the end of the month amounted to 154 million pounds. Of this amount, American cheddar cheese totaled 133 million pounds.

Shell egg stocks increased 661,000 cases to 1.6 million to total the largest March stock in store since 1946. More than a third of the total shell egg supplies weer in East North Central storages while stocks in the Middle Atlantic and Pacific Coast storages were evenly divided with each holding about a sixth of the national total.

Frozen egg holdings increased by less than average amounts during March and by the end of the month totaled 84 million pounds.

Poultry holdings were reduced during March to 233 million pounds. The March net withdrawal of 37 million pounds was less than average and the net change last year. During the 5-year period ended 1951, March net withdrawals totaled 44 million pounds, and last year poultry holdings were reduced by 49 million pounds.

A contra-seasonal movement of beef storage stocks brought national holdings up to 254 million pounds—an increase of .4 million pounds during March. Frozen beef totaled 244 million pounds or about twice the amount in store last year and amount on hand March 31 during the 5-year period. Total pork in storage increased to 810 million pounds—an increase of 16 million since the end of February. National holdings were a fourth greater than last year and more than two fifths greater than average. Frozen pork holdings reached at an all-time high — 547 million pounds. All meats in storage amounted to 1.2 billion pounds, which represented more than half of the total weight of all commodities in freezer storage in the Nation.

Stores of fishery products—frozen and cured—were reduced during March to 131 million pounds as net withdrawals during the month totaled 12 million pounds.

Storage Outlook

Cooler occupancy started on the upward cycle a month earlier than expected. Although cheese moved from storage in greater than average amounts during March, which would have reduced cooler utilization, this was countered by a heavy into-storage movement of shell eggs and a less than average reduction in stocks of fresh apples and pears. Occupancy should continue on an upward swing during April and since shell eggs ordinarily show the greatest increase during April, occupancy by the end of the month should be 2 to 4 points above the March 31 level. Freezer occupancy on the other hand is expected to decline during April as indicated by the 5-year average. The expected decrease is 4 points, but whether this change will prevail depends upon the relative movement of frozen meats which now are at near record levels. According to previous performance, meats should move from storage during April as will frozen fruits, vegetables, and poultry.

Canadian Holdings of Fruits and Vegetables

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on March 1, 1952.

Apples in cold and common storage on March 1, 1952 amounted to 1,504,000 bushels as compared with 2,578,000 bushels February 1, 1952 and 3,114,000 bushels March 1, 1951.

Frozen fruit holdings in storages and factories March 1, 1952 amounted to 18,527,000 lbs as compared with 20,699,000 lbs February 1, 1952 and 12,927,000 lbs March 1, 1951.

Stocks of frozen vegetables in storages and factories on March 1, 1952 amounted to 10,355,000 lbs as compared with 11,394,000 lbs February 1, 1952 and 10,413,000 lbs March 1, 1951.

The following commodities were reported held in cold storage on February 1, 1952.

Apples in cold and common storage on February 1, 1952 amounted to 2,578,000 bushels as compared with 3,866,000 bushels January 1, 1952 and 4,511,000 bushels February 1, 1951.

Frozen fruit holdings in storage and factories February 1, 1952 amounted to 20,699,000 lbs. as compared with 21,699,000 lbs. January 1, 1952 and 14,852,000 lbs. February 1, 1951.

Stocks of frozen vegetables in storages and factories on February 1, 1952 amounted to 11,394,000 lbs. as compared with 12,962,000 lbs. January 1, 1952 and 11,264,000 lbs. February 1, 1951.

Refrigerated Warehouse Expands to Meet Needs for Defense Program

GRADING operations started early in February and general contracts will be let within a few weeks for a $1,500,000 cold storage warehouse to be constructed at East Parkway South and Spottswood, Memphis, Tenn. by the Mid-South Refrigerated Warehouse Co. When completed, the new warehouse will be the largest in the midsouth area and one of the most modern in the nation. The new plant is being built to take care of naval and military needs of the expanding defense work in that area.

It will have more than 100,000 square feet of area on one floor at truck and railroad car level devoted to cold storage, most of which will be refrigerated to 20 degrees below zero. The refrigeration will be obtained by a liquid ammonia recirculation system. The several compressors will be of the multicylinder reciprocating type with additional machine capacity as standby. Individual rooms will have forced-air blowers with distributing duct work. Each of six freezing units will have capacity to fast freeze 30,000 to 10,000 pounds at a time. Total freezer storage capacity will be 1,000,000 cubic feet.

Mechanical Handling

A system of battery-operated fork lift trucks and mechanical transporters will rapidly move shipments from truck docks along the east and west sides of the building and from the five-car Southern Railway siding along the north side of the building to the quick freezing rooms. A public address system will assist operators and speed the flow.

In addition to the first floor there will be a 15,000 square foot area on the second floor along Spottswood. This two-story portion will be conservative, yet modern, design, faced with architectural monolithic concrete and continuous steel windows. The entire structure will be steel frame with precast concrete roof decking and "tilt up" concrete walls. The building will be fire resistant, sprinkler protected throughout and vermin and rodent proof.

Wall and roof insulation will be provided by a number of layers of cork. The floor is to be of the "sandwich" type construction. The wearing surface will be of reinforced concrete with layers of cork just below, with a subfloor of reinforced concrete with layers of cork just below, with a subfloor of reinforced concrete acting as structural support. A system of underfloor ducting is to be installed to prevent frost penetration into the ground.

The building has been designed by by A. Epstein & Sons, Inc., Chicago, engineers, nationally known specialists in refrigerated and industrial construction.

Building permits, priorities and allocations of steel, copper and controlled materials for the 400 by 250 foot structure already have been made by the National Production Authority. Steel and controlled materials have been purchased and bids for the general contract will be advertised as soon as working drawings for the project are completed.

William W. Goodman is president of the company and T. E. McCrary is vice-president and general manager. The two hold the same positions with the Memphis Cold Storage Warehouse Company, the oldest cold storage operation, and at present the largest in that territory.

Reducing Injuries of Potatoes in Grading

NEW methods to reduce bruising and other injuries to potatoes during grading are reported by the U. S. Department of Agriculture. The recommendations are based on studies by Dr. J. M. Lutz, plant scientist, and A. D. Edgar and A. H. Glaves, agricultural engineers, at the Red River Valley Potato Research Center, East Grand Forks, Minn.

The researchers point out that small bruises made during grading often develop into serious injuries by the time the potatoes reach consumers. Some varieties, notably Triumph, are more susceptible to bruising than others.

The findings show that bruising can be reduced during grading by:

(1) Padding graders with sponge rubber at points where the potatoes drop. Hoppers and delivery chutes are critical spots.

(2) Using a shorter drop in filling the sack. This may be achieved by hooking up a corner to the sack until it is half full or by using a hydraulic bag holder, which lowers the bottom of the bag as it is filled.

(3) Warming potatoes from the storage temperatures—usually 32 to 39 F—to 56 F and holding seven days before grading. Sprouts, which develop during the warming treatment, break off during grading. Warming is difficult in many storage houses, so this practice is recommended only when bruising cannot be controlled by careful handling, padding of equipment, and the elimination of long drops.

The scientists note that new injuries are less likely to occur late in the spring after the potatoes sprout. Then they are less "brittle" than when harvested. They advise growers who have large lots of potatoes that are susceptible to bruising to hold them until late in the shipping season.

Commodity Storage Manual

A NEW commodity storage manual has been designed by The Refrigeration Research Foundation as a place to keep late information on refrigerated storage of individual commodities, also other up-to-date practices essential to good refrigerated warehousing. It is arranged for an alphabetical, classified arrangement.

The manual is designed especially for operating personnel, but contains useful information of interest to anyone concerned with the refrigeration and refrigerated warehousing of commodities. It is being added to and revised at regular intervals with new information. Every other month, four to six new subjects are being added, so that in a few years, the manual will be a complete handbook of latest, practical knowledge on refrigerated storage, prepared by distinguished commodity storage experts in this country and abroad.

It is available at no charge to members of T.R.R.F. An alphabetical index tab, recommended for quick and easy reference will be supplied upon request, at a nominal price.

Research Makes for Jobs

IT IS no accident that America has become a powerful industrial nation, with the highest employment of workers at the highest rate of pay—and enjoying the highest living standard in the history of the world. To develop and mass produce manufactured items which began as mere ideas, American industry maintains more than 2,300 research laboratories in which 90,000 scientists work, and spends more than $500,000,000 a year on research.—NARW Cold Facts.

Karnes Named President of Beatrice Foods

THE Board of Directors of Beatrice Foods Co. has elected William G. Karnes president to succeed Clinton H. Haskell, who died March 21. He had served as executive vice-president since 1948.

William G. Karnes

Mr. Karnes joined the company's legal department in 1936 and later headed a newly organized department of labor relations. In 1943 he became vice-president and assistant to the president and in June 1947 he was elected a director. He was graduated from Northwestern University law school after having previously taken a degree in commerce at the University of Illinois.

Mr. Karnes is also a director of the Milk Industry Foundation, the International Association of Ice Cream Manufacturers and the Illinois Chamber of Commerce.

Willard V. Haskell, manager of the company's Topeka, Kansas plant, who has been associated with the company for 29 years, and Harold F. Nichols, president of the First Galesburg National Bank & Trust Company of Galesburg, Ill., were elected directors to fill vacancies created by the death of Clinton H. Haskell and Wallace Thompson of Galesburg.

Egg Products Inspection Program Is Revised

THE U. S. Department of Agriculture has announced revision of regulations covering the processing and packing of egg products (liquid, frozen and dried eggs) under its voluntary continuous inspection program.

Immediately effective, the revisions provide for two official identifying marks—a shield and a rectangle—to be used on egg products processed under USDA supervision and specify the kinds of raw materials which may be used under each mark. In the past, there was only one official identifying mark for egg products—the shield.

The new regulations do not change the quality requirements for egg products eligible to bear the official shield. However, the revised program provides for the supervision and identification of the entire production of edible egg products in an official plant and the denaturing of shell eggs or egg products found unfit for human food. Wholesome products not fully eligible to carry the shield designation will be identified by a rectangular mark.

The program also requires that frozen products bearing the rectangular mark must be drilled and inspected after freezing, and found in fit condition by an official grader of frozen eggs, before they can be shipped.

Egg products produced in non-official plants may be inspected on request and a covering certificate issued to indicate the results of the inspection, but they will not be identified by either the shield or the rectangular mark.

Ceiling Heights for Mechanized Handling

A COMMENT is offered by C. C. Powell of the Crystal Ice & Cold Storage, Sacramento, Calif., on the report on ceiling heights for mechanized handling issued by The Refrigeration Research Foundation and published in the January issue of ICE and REFRIGERATION.

Mr. Powell explains how his company has handled rooms of various ceiling and piling heights. A plant survey, he says, revealed some lots of merchandise stacked too high and some not high enough, thus a loss of valuable space. Measurements were made to determine proper maxima for various rooms. This information was tabulated and copies placed in transparent envelopes at all entrances to the building. A measuring stick 6 feet long graduated with 6-inch markings was placed with each tabulation sheet.

When the receiving clerk lays out the pattern for packages on a pallet, he checks the piling height of the room where the commodity is to be placed and with the measuring stick it is a simple matter to tell the truck driver or warehouseman how high the pallet should be loaded with the packages. This procedure has saved time, eliminated confusion, and enabled them to obtain better occupancy, according to Mr. Powell.

Shrimp Associations Work for Quality Control

AN IMPORTANT step forward in expanding the North American market for shrimp was taken last August when the Texas Shrimp Association and the Camara Nacional de la Industria Pesquera voted to merge into a single organization to be known as the Shrimp Association of the Americas. Dedicated mainly to research, sanitation and quality control, activities of the new group are of increasing interest to public warehousemen.

Warehousemen are aware that in the past the blame has too often been unfairly placed on them when a product of inferior quality appeared on the frozen seafoods market. They know that refrigerated warehousing can only preserve the quality a product had when it first went into the freezer.

If the Shrimp Association of the Americas can institute an effective quality control program, quality shrimp will go into the freezer, and, consequently, quality shrimp will come out of the freezer. The Association also has started an aggressive promotion and advertising campaign in the United States to sell more shrimp. Currently serving as chairman of the Research and Quality Control Committee of SAA is R. T. Mackenzie of United States Cold Storage Corporation.

New Brochure on Value of Refrigerated Foods

A TOTAL of more than 80 percent of the food consumed by the average U. S. family is refrigerated somewhere in its journey to the family dinner table. This fact is graphically illustrated in a new brochure, "Why We Eat Better," released and distributed to members by the National Association of Refrigerated Warehouses.

Public refrigerated warehouses, the Association says, are the key link in the chain of distribution through which perishable foods reach the family table. NARW attributes the rich, varied diet of today's average American family to scientific advances in the refrigeration process. An interesting feature of the brochure is a table showing, by type of product and weight, what the average American eats annually.

Copies of "Why We Eat Better" are available on request. Requests for the brochure should be addressed to the National Association of Refrigerated Warehouses, Tower Building, Washington 5, D. C.

New Light Weight Concrete Provides Both Structural and Insulating Values

A LIGHT-WEIGHT insulating concrete, known as Bildrok is finding favor with builders of new construction with low temperature rooms. It is especially adapted to roof fill insulation poured monolithically over structural roof decks or over paper-backed welded wire mesh. Properly reinforced, it can also be poured monolithically over ribbed metal lath and other similar supporting forms. It screeds smooth in one operation; forms a hard surface free from flaking, assuring a good bond.

In addition to its structural advantages, it provides excellent insulation, fire resistant, lightweight, strength and economical final cost qualities. It weighs about 22 lbs per cubic foot, has a compressive strength of 125 lbs per square inch and a thermal conductivity of 0.62 Btu's. Its principal advantages are its permanence, it is rot-proof, fireproof and odorless.

The basic material from which the aggregate is made is "perlite," a volcanic glass mined in the West. The refined ore is brought into Chicago, processed in a high-temperature furnace where the volcanic glass is expanded about ten times to form a white granular material weighing about 8 lbs per cu ft and having high insulating properties. The countless number of tiny dead-air cells sealed in the glass globules of aggregate are waterproof and moisture-proof, and so insulate very efficiently. Because the air cells within the particles of expanded glass are formed at temperatures above 1600 F, they are actually under partial vacuum, and this is one of the reasons for the unusual insulating efficiency of the material.

By definition, perlite is a volcanic rock which, when heated quickly to a suitable point in its softening range, expands to form a lightweight noncombustible glass-like material of cellular structure. Its weight is about one-tenth the weight of sand. Crude perlite ore has a bulk weight of 65 to 85 lbs per cu ft whereas in its expanded form it ranges from 4 to 30 pounds per cubic foot. Permalite plaster aggregate weighs from 7 to 9 pounds per cubic foot as compared with 100 to 110 pounds for ordinary sand. Permalite concrete aggregates are produced in the range of 7 to 12 pounds and 12 to 16 pounds per cubic foot.

One of the construction jobs in which this material was used was the plant of the Continental Freezers of Illinois, described and illustrated in this issue. Another was a small cold

(Continued on page 56)

Mixing, placing and finishing Bildrok insulating concrete on floor of new plant of Continental Freezers of Illinois. The floor was 12 inches thick.

Refrigerated Storage Offers Service For Non-Food Products

MANUFACTURERS of numerous products (finely machined, chemically stabilized, or otherwise brought to a stage of best and most salable condition) are often faced with the necessity of finding the most appropriate place in which to store them during periods when large quantities must be stored for greatest economy. Metallic products may require protection against corrosion; ball bearings are an example.

Rubber goods or goods containing rubber, fine wrapping materials, fine leathers, photographic materials, natteries, and similar products have physical and chemical properties that often cannot be protected by unit packages and are thus exposed to variable temperature and humidity. The answer for such products is storage space where temperature and humidity are under control. The same is true for many plant and animal by-products, materials used in pharmaceutical, cosmetic, and drug manufacture, ornamental plants, and so on.

Storage operators with facilities for good control of temperature and relative humidity are able to provide appropriate conditions for many of these products. Extension of the use of a cold storage plant for non-food products is largely a local problem, varying with local industry and climate. The examples below are therefore illustrative as well as practical. They were selected from material collected at Massachusetts Institute of Technology in a project aided by the Refrigeration Research Foundation recently. Specific temperatures and humidities are often not common and general knowledge, but they are commonly known and recommended by makers or handlers of the products.

Photographic Films

Materials that are photosensitive deteriorate with age and the deteriorative process is slowed down as temperature is lowered. As the process continues, the film loses its sensitivity and color film, which consists of several layers, may lose its balance of sensitivity. Both black-and-white and color films should be stored below 70F. for a period up to two months, below 60F. up to six months; below 50F. up to twelve months. Some films may require even lower temperatures, as recommended by manufacturers, and temperatures lower than those recommended are not harmful. Relative humidity should be kept at 40-60 per cent.

Processed film (film that has been exposed) is less temperature-sensitive than in unexposed and unprocessed film, but humidity is very important because of the danger of sticking, mold, etc. Safety film (as distinguished from inflammable film) should be stored at about 60-80F. and relative humidity of 25-60 per cent. Nitrate films require special fireproof vaults.

Wrapping Materials

Wax-coated materials (particularly waxed papers to be used as wrapping materials) will stick together and become unusable if exposed to high temperatures. Consequently, storage temperature constantly held below room temperature is necessary. Cellophane requires a cool place (about 60 to 70F.) with a relative humidity of 45 to 50 per cent. Aluminum foil requires a dry storage place.

Carborundum Paper

In shaping and finishing leather articles, carborundum paper can be used for abrasion purposes longer if held at a relative humidity of 50 per cent. Many manufacturers of leather goods are now storing carborundum paper in refrigerated boxes in which the desired relative humidities can be regulated by temperature control.

Patent Leather

Types of leather that have a very glossy finish (such as patent leather) will tend to stick together when temperature rises above room temperature and is much better protected and much more easily handled when held at lower temperature constantly.

Storage Batteries

Automobile storage batteries, and also other batteries, will lose electrical charge faster when exposed to high temperature, and since recharging is expensive, it may be a great advantage to manufacturers and distributors of batteries to hold them at low temperature, 32F., or possibly even lower. More information is needed on specific temperature but it is undoubtedly true that the chemical action of loss of charge is reduced by low temperature.

Botanicals

Botanicals (roots, bark, leaves, herbs, etc.) used in liquors and cordials must be held in refrigerated storage until used, in order to preserve flavoring constituents. Low temperature might likewise be helpful for pharmaceuticals (similar to materials used in medicine).

Bulbs

Refrigeration retards or hastens growth of bulbs. With proper storage temperature, ranging from 35 to 90F., according to stage of bulbs and according to variety, tulips, hyacinths and other bulbs can be made to flower at any time of year. A proper sequence of temperatures is absolutely essential for good quality of bulbs.

Rose Bushes

Rose bushes can be held at any stage of development by refrigeration. Flow of sap is stopped and starch content is equalized; static condition can be maintained several months. Problems of wholesalers involving distribution of large numbers have been solved by refrigerator storage, as shipments can be made three or four months later than usual with subsequent good growth. Refrigerated rose bushes set out in April grow faster and are eventually farther advanced than those handled in usual manner and set out in January.

Paintings and Art Objects

The utilization of refrigerated air conditioned storage for paintings and other art objects of textile origin insures long life against the ravages of fungi and insects. Some art galleries have already installed refrigerated air conditioning equipment. Many others might utilize the advantages of commercial warehouse facilities offering similar protection.

Holly

In Oregon, production of holly for the Christmas season is a fairly large industry. Holly is shipped to all parts of the United States during the latter part of November and early part of December. Shortly after harvest, it is packed and placed under refrigeration at 35F. until shipped in refrigerated cars.

Christmas Trees

Some trees are cut and stored long before the Christmas season, and tinted before they are stored. For storage, temperatures and humidities are regulated in accordance with requirements for best physical condition.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE NDUSTRIES

Executive Offices
1706 L St. N. W., Washington 6, D. C.

Executive Secretary
Guy W. Jacobs, Washington, D. C.

President
Wm. J. Ayers, Memphis, Tenn.

First Vice-president
Paul H. Andres, Oklahoma City, Okla.

Second Vice-president
E. L. Gunn Jr., Atlanta, Ga.

Treasurer
Geo. Steers, Jr., Kalamazoo, Mich.

THIS MONTH IN BRIEF

Effective trade paper advertising has been produced by the Public Information and Marketing Department of the National Association of Ice Industries to help ice distributors push the Meat-on-Ice program among their retail meat store customers.

A legal opinion on the Orrison reissue sized ice patent has been written for the National Association of Ice Industries by Charles M. Thomas, patent attorney of Washington, D. C. Mr. Thomas says it is his opinion that the reissue patent may be invalidated on the same prior public use as the original patent.

The New Orleans Ice Delivery Corp. has been dissolved following a consent decree in suit charging violation of the Sherman Antitrust Act.

A large chain grocery in Toledo, Ohio has installed an automatic ice cube vending machine in conjunction with a reach-in cooler and beverage department.

Ice men in various states meet in annual conventions to discuss plans for broadening markets and other problems of the industry.

Meat Dealers Bombarded with Advertising And Publicity on "Meat-on-Ice"

TO HELP ice distributors develop the "Meat-on-Ice" project among their retail meat stores the Public Information and Marketing Department of the National Ice Association has gone all-out to produce effective trade paper advertising, to create favorable publicity and to provide literature for selling customers.

Starting in March, the entire grocery advertisement space carried the one message, "Meat-on-Ice Boosts Grocers' Profits." This first advertisement will announce this new trend in meat refrigeration in Chain Store Age, Progressive Grocer, March; Cooperative Merchandiser, Meat Merchandising, April; National Grocers'

NEW "COMBINATION" DISPLAY METHOD IS KEY TO BIGGER MEAT PROFITS
Meat-on-Ice Reduces Shrinkage, Increases Sales, Requires No Equipment Changes
From Syracuse to Los Angeles, from St. Paul to St. Louis the word is spreading fast: "Combination refrigeration—coils plus ice—is the greatest idea to hit the retail meat business in many a year!"
Pre-tested in college laboratories and proved in hundreds of stores, it has been demonstrated beyond question that combining crushed ice with mechanical refrigeration is a positive boon in these days when it is so difficult to retail meat at a reasonable profit—or any profit at all. In Southern California alone over 300 markets are already using the new Meat-on-Ice "Combination" Method and are enthusiastic.
Your local Ice Company has all the facts about Meat-on-Ice. Get in touch with them now—for higher profits!
Meat-on-Ice means:
1 Less shrinkage
2 Better color holding
3 Less bleeding
4 Less down-gradina
5 Less trimming
6 More even temperatures
7 No bad case odors
8 Savings in time and labor
9 Protection against power failure and system break-downs
10 Increased sales
Adding up to Greater Profits
For LOWER LOSSES . . . HIGHER SALES
DISPLAY MEATS, POULTRY, VEGETABLES
ON CRUSHED ICE
National Association of Ice Industries
1706 L Street, N. W.
Washington 6, D. C.

Announcement advertisement on Meat-on-Ice which will appear in thirteen grocery and meat publications with combined circulation of 1,110,666 readers.

Bulletin, Super Market Merchandising, Voluntary & Cooperative Groups Magazine, May; Chain Store Age, Progressive Grocer, June; Cooperative Merchandiser, Food Topics, Meat Merchandising, July; National Grocers' Bulletin, Super Market Merchandising, Voluntary & Cooperative Groups Magazine, August. The combined circulation of this campaign is 1,110,666 which just about blankets the grocery market.

Other merchandising helps include reprint of an article from one of the meat trade papers; an issue of Grocery Market News, "Does Meat-on-Ice Really Pay" presentation manual for salesmen; a handout folder for customers; a four-color broadside for meat dealers; and a point of sale banner.

Recordings Used

After hearing the Meat-on-Ice presentations at the National and State ice conventions (fully reported in ICE AND REFRIGERATION), many ice men asked for duplicate recordings of interviews of meat market operators and color slides for their own use. These are now available in a visomatic slide film presentation which includes: (1) full-color slide films, (2) an instruction sheet, (3) a Visomatic recording of testimonial interviews with handlers of fresh meat displayed on ice. The record is a 16 inch disc which runs for 15 minutes on each side.

This record could also be used for bringing firsthand, unbiased opinions to meat-handler customers. With a little ingenuity, the film strip can be manipulated to serve also as a customer presentation.

Legal Opinion Declares Orrison Reissue Patent Conflicts With Court Rulings

A FULL report on the current status of the Orrison sized ice patent, including the reissue specifications dated December 26, 1951, and a legal opinion on the validity of the reissue patent 23,446 by Charles M. Thomas, patent attorney of Washington, D. C. has been issued by the National Association of Ice Industries.

The patent as originally granted Kelvin T. Orrison on May 24, 1938, after being held invalid and void by two United States District Courts and one U. S. Circuit Court of Appeals, was surrendered on August 12, 1951 and a Reissue Patent No. 23,446, based on certain alleged novel features, was issued Orrison by the United States Patent Office on December 25, 1951.

Reissue Claims Weak

In this opinion, Mr. Thomas points out that the first seven claims of the original patent, including alleged product and method claims, were found to be invalid, and anticipated by a number of prior public uses. In regard to the reissue patent, he states that while some validity attaches to grant of the patent by the U. S. Patent Office, this validity is not conclusive and may be invalidated on the same prior public uses.

The opinion further states that "investigation has led to the considered conclusion that the reissue was granted in defiance of the above-recited opinions and is irreconcilable with the direct holdings of the different courts in such opinions. The reissue claims appear to differ from the original claims only in verbiage and in unessential and unpatentable respects and do not in my view vitalize the sterile and invalid claims of the original patent. If suit should be instituted thereon against any member of the association I feel that the court would hold the reissue claims to be void or invalid under the adjudications heretofore made in the prior litigations based upon the original patent. I reached this conclusion because it appears obvious to me that the reissue claims add nothing of patentable significance to the void and surrendered claims of the original patent."

Conclusions

Following a discussion of the points involved, Mr. Thomas offered the following conclusions:

For the reasons stated herein it is my opinion that the reissue claims are definitely invalid in view of the prior uses and prior patents and publications herein discussed.

The grant of the reissue with claims differing only in immaterial and unpatentable respects from the original claims declared invalid by three courts appears to be antagonistic to and irreconcilable with the definite findings of these courts in such litigations.

In my judgment the reissue claims contain no limitation differing in vitalizing and patentable respects from the invalidated claims of the original patent.

Ice Companies Cooperate In Poultry Merchandising

WITH the cooperation of ice companies in several cities, the Poultry and Egg National Board's program of training schools for retailers is having a successful winter series on the East Coast, according to a recent NAII Ice News.

Beginning in October the schools, in which ice is strongly advocated for poultry display, have been held in Trenton, N. J., Newark, Providence, and many other communities on the Atlantic seaboard under the supervision of the Northeastern Poultry Producers Council. ("Neppco" is an affiliate of the Poultry and Egg National Board.) By the end of January, a total of 1086 retailers had attended the schools.

Each school consists of a four-hour course of lectures and demonstrations designed to show retailers the most profitable methods of merchandising poultry. The Department of Agriculture sanctions the course and assists in supervision. Poultry industry leaders from various sections of the country serve as an advisory council.

The National Association of Ice Industries has worked in close accord with the Poultry and Egg National Board to further the success of the program. At a merchandising forum put on by the board in January, C. P. Austin of NAII served as panel expert on ice display of poultry.

The schools have been set up as a four-year project and plans are to conduct them in as many states as possible. So far they have been held in Missouri, Illinois, Indiana, Nebraska, Minnesota, Michigan, Oklahoma, Texas, Maryland, Virginia, New Jersey, Massachusetts, New York, Connecticut, Rhode Island and Delaware.

Ice companies have in many instances supplied ice for the classes without charge, and manufacturers of ice display cases have been helpful in providing the needed fixtures. As a cooperative effort for icemen, this activity is well worthwhile.

The schools are set up in each community with the help of a local sponsoring group, which makes preliminary arrangements, provides space and arranges for equipment. Ice companies in cities not yet used as school sites should sound out local poultry retailers, wholesalers and processors on their interest in forming a sponsoring group. Once the group is formed, a request for a school can be sent to Charles D. Hawks, director of Retail Merchandising Training, Poultry and Egg National Board, 308 W. Washington Street, Chicago 6, Ill.

City Products Annual Report

NET profit of City Products Corporation, for the year 1951 amounted to $3,764,996 or $3.01 per share, after allowing for $3,092,326 depreciation and $2,900,000 Federal taxes. Net sales amounted to $78,831,553 as compared with $72,110,300 in 1950, an increase of 9 percent and the highest ever reported by the Company. In the preceding year, net earnings were $4,738,020, or $3.78 per share.

Results for 1951 were affected to a large degree by a steady and continuing increase in operating costs which could not be recovered in the pricing of the Corporation's various products due to existing Governmental price controls. Earnings were also affected by the increase in Federal tax rates.

The Company continues to diversify its interests and during the year created a Natural Resource Division and made a modest investment in this new field in gas and oil properties which are presently producing revenue.

Further expansion is contemplated in the company's present market area through product advertising and aggressive merchandising and the continued acquisition of well located properties.

In addition, the company continues to actively search for further diversification in the field of entirely unrelated businesses.

Ice Company Opens Low Temperature Storage

THE Mona Lake Ice Company, Muskegon Heights, Mich., will open a new phase of business about April 1, in connection with their regular ice business. The new department will be low temperature freezer storage.

A large building attached to a side of the ice plant, erected in 1945 and containing 50,000 cubic feet of space, has been converted to freezer storage space. Previously the building had been used for storage of ice but production is now capable of keeping up with demand, according to Alfred Nielsen, manager.

Pipes and machinery had to be installed in the structure, and a loading dock added. Total cost of preparing the building was $20,000.

Mr. Nielsen emphasized that the storage facilities are designed for large quantities, from 1,000 pounds up, including such foods as fruits and poultry.

Operating at capacity, the new plant will be able to freeze 22½ tons of cherries or a similar commodity in 24 hours.

Little Ice Makers Ain't What They Were Cracked Up to Be

FROM a trade paper serving the household and small mechanical refrigerator trade comes a news comment that reiterates warnings anent the small commercial ice maker voiced by members of the ice industry when they were first introduced. William G. MacBride, commercial service manager for York Corp. speaking at a recent RSES convention, as reported in NAII Ice News:

"Water and electrical troubles are the two major problems encountered in field servicing of automatic ice cube makers. Poor water is the most frequent cause of trouble. Where water contains a high percentage of solids, the machine won't produce clear ice, and further these solids will deposit on various parts of the system, including the evaporator tubes in which the water is frozen into ice cubes," he explained.

Excessive deposits can reduce the efficiency of the refrigeration system itself by cutting condenser capacity, but probably more harm will be done to the pump and other parts of the water circulating and freezing system, it was indicated.

With specific reference to York's model 450 ice cube maker, MacBride explained that if excessive deposits of solids from the water are permitted to build up on the inside of the evaporator tubes, serious damage may result.

"These solids may prevent the ice columns in the last two evaporator tubes from melting sufficiently to fall down out of the tubes during the harvesting cycle," he said. "If this happens, the water that freezes between the partially melted ice column and the sides of the tube during subsequent freezing cycles will bulge the sides of these tubes, which will then perhaps have to be replaced."

Editor Reports Gripes

Another vital bit of information comes from a top trade paper editor who had returned from a nationwide tour of hotels, restaurants, and fast food service outlets. He said:

"There is grumbling in the trade because ice machines are a lot more expensive than the purchasers were originally given to believe. As far as the smaller places are concerned, the initial cost, plus maintenance make the machines too expensive and cost more than Iceman's ice. As for the larger places, due to limited quantity of ice, this makes it uneconomical for use of ice machines. In addition they also have to order ice from the ice company.

"Another condition that exists in some areas, regardless of guarantees by ice machine companies, is the lack of proper servicing facilities. Spare parts are getting very scarce.

"Personnel hired by the fountain-restaurant outlets are often of a low education level who either fail to understand how to handle ice makers or neglect to care for the machines. This situation often results in unnecessary breakdowns, harmful tampering, expensive repairs and extra ice purchases. About the worst thing that can happen to a restaurant of any kind is to run out of ice."

This editor also suggests that when talking to customers, icemen dwell on these points: Do you know what ice is costing you? With iceman's ice there's no fuss, no muss, no initial expense. Suggest that customer let the iceman have the headaches. After all, the modern way is to have service rendered through package delivery. In general, milk, baked goods, vegetables, meat are all delivered. He feels buying an ice machine is like boarding a cow or doing the restaurant's baking on the premises.

One question: I wonder how many restaurants would be interested in doing their own gardening? Might sound a bit ridiculous; but it sometimes takes a little exaggeration to prove a point, or make a sale!

California Consumers Sells Ice Manufacturing Plant

THE California Consumers Corporation, Los Angeles, recently sold its ice manufacturing plant at 9348 Santa Monica Blvd., Beverly Hills. The purchasers, a syndicate headed by William Katz, plan to modernize the building for use as deep-freeze, cooler and refrigerated holding rooms. Total investment including contemplated improvements will exceed $250,000.

City Delivery Co. Dissolves

THE City Ice Delivery Co., San Francisco, Calif., has announced that it has elected to wind up its affairs and voluntarily dissolve. Proceeding for the dissolution commenced April 3, upon filing of written consent of shareholders.

New Orleans Delivery Company Dissolved

THE New Orleans Ice Delivery Corp., New Orleans, La., was fined $2500 by Federal District Judge Herbert W. Christenberry after a plea of nolo contendere to a charge of violating the Sherman antitrust act.

At the same time a civil action seeking an injunction restraining the corporation from further violations of the act was settled when Judge Christenberry signed a consent decree which was agreed to by the corporation and the government. The decree grants the injunction and provides for the dissolution of the corporation.

The delivery corporation, four ice manufacturing companies, and eight officers of ice manufacturing companies, were indicted by a federal grand jury on April 28, 1950. The indictment charged that from 1943 to the date of the indictment the defendants combined to eliminate competition in the sale and distribution of ice and the furnishing of icing services in the New Orleans area.

Pooled Production

It was alleged that the defendants pooled in the delivery corporation their entire production, allocating and limiting the production among themselves, fixing prices of ice and services, allocating customers and restricting the importation of ice into the New Orleans area.

William J. Guste entered the plea for the delivery corporation. United States attorney John N. McKay then told the court that he has been instructed by the justice department to dismiss the charges against all other defendants in view of the plea.

The defendants against whom the charges were dismissed include the New Ice Company, Inc., and Benjamin T. Brown, vice-president, Pelican Ice Service, Inc., and T. S. Behre, president, Crystal Ice Service, Inc., and A. E. Wegener, its vice president; French Market Ice Manufacturing Company of New Orleans, Ltd., and S. P. Simone, president; J. W. Joachim, operator of the Home Ice Company; John E. Pottharst, Jr., operator of the Marine Ice Company; Frank A. Herman, operator of the Gulf States Distributing Company; and H. C. Johnson, operator of the Ice Service Company.

Horace L. Flurry, senior trial attorney for the justice department's antitrust division, testified that the government's investigation of the ice industry in New Orleans grew out of a similar case in Shreveport during the trial of which "probable violations" were indicated in New Orleans.

He said that in 1943 the Ice Delivery Corporation was formed by thirteen ice manufacturers as a stock company with the stock allocated in relation to manufacturing capacity.

"At the directors' meetings prices were discussed and prices to be paid to the manufacturers was fixed by the delivery corporation," Flurry testified. The directors of the delivery corporation also fixed an amount of production for each manufacturer, he said, and all of the output of the manufacturers was sold to the delivery corporation which was operated as a non-profit enterprise. If there were any profits, he explained, they were divided among the manufacturers on the same basis as the stock.

Elimination of Routes

Under questioning by Guste, the department of justice attorney said that during the course of the investigation the officers of the firms involved told him and submitted affidavits in support of the statements that in 1943 the office of defense transportation insisted that the ice companies "do something to eliminate duplication of routes and wear and tear on the rolling stock."

Complied With Ceiling Fixed by OPA

He also said, in response to Guste, that prices charged by the ice companies were in accordance with the ceilings fixed by the office of price administration while it was in existence.

The only witness to appear for the defendant company was Peter Graffagnino, secretary of the Republic Ice Company, who told of a meeting in 1943 with a representative of the ODT who explained to a number of ice manufacturers present that they would have to "do something about duplication of deliveries or they would make it tough to get tires, oil and gasoline."

The witness said: "The pressure was put on and we had to get together." He also said that the formation of the delivery company was not a profit-making venture.

In assessing the fine, Judge Christenberry said: "It is clear that to some extent the formation of the company was brought about by the office of defense transportation, but the organization went beyond the request to pool the rolling stock."

Ice Skating Rinks Popular in Denver

The University of Denver's hockey team in action in the school's new ice rink. The rink measures 88x185 feet.

SINCE the end of the last war, three huge artificial skating rinks have been constructed in Denver, Colo. In all, they use more than 140 tons of brine-carrying wrought iron coils to provide skating regardless of the date. Their combined area gives Denverites more than an acre of skating surface.

The three rinks are located at the Denver Coliseum, Denver Country Club, and the University of Denver. The University's rink is an especially interesting installation. The Field House that holds it was erected originally at the Naval Training Station at Farragut, Idaho. At the end of World War II, that station was deactivated and the enormous structure was disassembled and reconstructed at Denver. The rink is used for hockey and pleasure skating. When not in use for skating, the floor is converted for basketball.

Kroger's Toledo Grocery Makes It Easy for Shoppers To Buy Ice Cubes

Grocery chain store in Toledo, Ohio installs automatic ice cube vending machine outside store, part of a three-phase program to promote beverage sales.

Reach-in cooler for sale of chilled beverages at Kroger store in Toledo.

ANNA KLINE

IN AN upper middle-class neighborhood in Toledo, Ohio where every home has a refrigerator and many have deep freezes, the Kroger Co., Cincinnati, midwestern grocery chain, recently opened up a new store which is bringing the crystal-clear ice-cube back into popularity. The Kroger Company's store in the Colony Shopping District features an automatic ice-cube vending machine, a drive-up beverage department, and a chilled reach-in cooler, to promote sales of bottled beverages, beer, and wine.

Ice-cube sales, at first only moderate, have increased each week as suburban hosts note the advantages of crystal-clear cubes, both in quality and in attractiveness, as well as in convenience. According to Carlton Fulkert, manager of the Colony outlet of this company, the practice of borrowing ice-cubes from neighbors when the home-made ice-cubes run out has virtually disappeared among his customers!

The automatic ice-cube vending machine is not only new in Toledo, but also to the Kroger Co. It holds 50 ten-pound insulated bags of cubes, and dispenses a bag for 25 cents in coins. The machine is outside of the store, and serves customers 24 hours a day. A light is attached for night customers who come for cubes after

Ice cube vending machine at side of Kroger's Toledo store.

Drive-up beverage department near ice-cube vending machine.

dark. The cubes are purchased from the Ice Delivery Co., Toledo, while the vending machine is a product of the Refrigeration Engineering Co., Montgomery, Minn. The grocery keeps additional bags of cubes in the cooler, and keeps the vending machine continually filled.

Beverage Promotion

The ice-cube vending machine is only part of a three-phase program to promote beverage sales. The drive-up beverage department provides a paved drive at the north side of the store exclusively for beverage customers. An employee is in attendance here at all times, for bottle returns and fresh purchases, using a special register located near the drive-up door for this service. He also provides change for ice-cube customers who need it. The customer can return empty bottles and get full cases without leaving his car, and the attendant is also ready to provide him with ice-cubes, as the vending machine is adjacent to the drive-up entrance.

Reach-in Cooler

A reach-in beverage cooler was installed in the store, for sale of chilled beverages. This cooler has five full-view doors for attractive display of merchandise from the store side, and also a side entrance so that customers in the drive-up parking lane can be served from it by the attendant, as well. The beverage cooler is 12x15 feet in size, and was made by Federal Refrigerator Manufacturing Co.

In addition to the chilled beverage cooler, the store has 12 feet of shelving adjacent for display of unchilled beverages, and an additional 6 feet of shelving for the display of bottled wines.

The beverage department takes up almost the entire north wall of the store's interior, and the 12-feet of non-selling space behind it is used in part for the cooler, seven feet of space (x12) for the drive-up service corridor, and 24 feet (x12) for storage of full and empty beverages. The service corridor has an entrance into the store itself, another to the parking lane, a third to the cooler, and a fourth to the storage room—so that each wall has a door.

Because this beverage department is an innovation in Toledo, and because the Kroger Co. has recognized that men customers can bring them added sales volume, they have used special advertising on the sports pages of local newspapers, emphasizing the speed, convenience, and economy of the drive-up beverage department, including the ice-cube vending machine as one of the pulling features of the store.

Decorated Ice Blocks Attract Attention In Display of New Juice Product

"Vegamato" display with decorated blocks of ice to attract attention presented by Cook's Market, St. Louis, Mo.

VEGETABLES frozen in a block of ice was used by Cook's Market, St. Louis, Mo., to attract attention to a new vegetable-juice compound, "Vegamato." A display was set up with cans of the product and in the ice was frozen a can of the product and tomatoes, lemons, beets, spinach, carrots, celery and parsley from which the juice is made.

The food broker who promoted the idea for his retailer customer was well pleased with the results—nearly 200 cans of the product were sold. Now he plans to conduct similar promotional stunts on other products frozen into blocks of ice. The ice, with its frozen contents was furnished by the Merchants Ice & Coal Co., St. Louis.

Freer Resigns as Secretary Eastern States Association

THE resignation because of ill health, of Samuel Freer as secretary-treasurer of the Eastern States Ice Association was announced recently. After being in a hospital for several weeks he is now able to be up and around.

Mr. Freer has been in the ice business all of his life, starting with John H. Bahrenburg in Brooklyn who sold natural ice to peddlers, in 1898. He was with the Mountain Ice Co., for several years and in 1916 became manager of the Ice Publicity Association of Philadelphia and vicinity and in 1939 manager of the Philadelphia Ice Sales Co. He has been secretary-treasurer of the Eastern States Ice Association since 1933. He has also been active in other association work, being a charter member of the National Association of Ice Industries and assisted in forming local ice associations in the cities of Baltimore, Pittsburgh and Buffalo.

R. H. Wilson, Quaker City Cold Storage Co., Philadelphia, Pa., has been appointed to take Mr. Freer's place as secretary-treasurer.

Glenn-Allen Wedding

THE marriage of John H. Glenn of the Glenn Ice & Fuel Company, Beardstown, Ill., and Miss Eleanor Allen of Lawrence, Kansas was solemnized at Lawrence, April 16. The bride is the daughter of Forrest C. (Phog) Allen, basketball coach at the University of Kansas. Mr. Glenn is popular among ice men of Illinois and other sections, and before his marriage was known as one of the ice industry's most eligible bachelors.

Reports from Unit Ice Associations

Indiana Ice Men Plan Broader Markets At 57th Annual Convention

BROADENING the market for ice was the main theme of the 57th annual convention of the Indiana Association of Ice Industries' meeting at French Lick, April 1, 2 and 3. Chief subjects discussed were corn icing, meat on ice, employee supervision, vending ice, vegetable icing and diversification.

The entertainment program included a get-together party Tuesday evening, followed by a "'prise" party. Wednesday evening the annual president's banquet was held followed by an entertaining floor show. For the ladies, there were informal bridge parties.

Indiana Officers for 1952

President, F. J. Henneberger, Princeton
Vice-president, H. L. Dithmer, Indianapolis
Vice-president, James D. Atkinson, Bicknell
Treasurer, Charles Scheidler, Greensburg
Executive-Secretary, Robert W. Walton, Indianapolis

Retiring President J. R. Jones welcomes new president, F. J. Henneberger.

Opening Session

Opening the convention at the Tuesday afternoon session, J. R. Jones of Oakland City, president, recalled that for many years the problems of the ice industry had come chiefly from the uncertainties of competition and how to enlarge markets for ice. We still have those problems, he said, but there is an additional one, that of how to get and retain competent help in these days of increasing wages. Now, more than ever before, he said, the ice man needs an association, State and National, to meet these problems but the association is valuable only to the extent that the members help furnish information and then use it.

Robert Walton, executive secretary, pointed out that this was the 57th annual convention of the association and that it must have had something of value to the ice men of Indiana to have kept in constant operation during those 57 years. He then reviewed briefly the service provided by the association during the last year including a drivers' training program, publicity through exhibits at grocers' conventions at the state fair and others, corn icing research, suggestions on meeting the competition of small ice makers and sales promotion material. The corn icing program, he said, had been especially successful and this year they expect that 1400 acres will be harvested and iced, and this will mean a greatly enlarged market for the sale of ice.

Some of the "bugs" in selling meat on ice were explained by Leonard Swartz of Indianapolis. He said this does offer a wonderful opportunity of selling ice, but he warned against over-enthusiasm and advised ice men not to think they can walk into a meat market and sell the operator on the idea without giving him a complete, authentic and satisfactory explanation of what it will do. Another necessity is to see that the case is properly iced with adequate drainage and other features to assure good service. This is particularly a good idea for the ice industry because it provides a good market for ice in winter as well as in summer. It isn't so difficult to sell the meat market men on the idea, but they also need to be kept sold and it is up to the ice company to see to it that the service continues satisfactory.

Speaking on orderly retrenchment, H. L. Dithmer, Indianapolis, pointed out the importance of good housekeeping as a means of preserving the stability and strengthening the position of the ice business. Better housekeeping, keeping the plant neat looking, impresses the public, customers, employees and bankers. Internal housekeeping is also important to keep the plant running smoothly and this should not be put off until the operation is in trouble.

Mr. Dithmer then outlined brefly a project inaugurated by his company some time ago of offering to sell ice wholesale to other ice plant operators in Indiana. This has worked out quite satisfactory in a considerable number of cases and additional ones are now in the discussion stage.

Wm. E. Glover, Ebner Ice & Cold Storage Co., Vincennes, Ind., criticized the ice men for being too complacent and thinking they can run an ice business the way it was run in the days of their grandfathers. For instance, he said, they are still making block ice while the market is more and more demanding processed ice.

Management Session

Opening the management session held Wednesday forenoon, G. Elwood Hookey of Indiana University, in charge of the driver training program for the association, pointed out that the ice industry is fortunate in being relatively free from public distrust.

In this situation many employees are apt to be careless of this good will. Management needs to keep employees informed on what the company is doing, supervisors especially. Lack of direct personal contact with the boss leads to misconceptions and lack of loyalty. Four keys to successful management, Mr. Hookey said, are: treat workers as individuals; use a man's ability to the best advantage; provide job satisfaction; plan and work together.

A. C. Lemons, South Bend, explaining the dealer-delivery service of his company, said that a changeover was made a few years ago when wages went up and it became difficult to get competent drivers. Under the dealer system, he said, they now have more older and competent men who take more interest because they feel it is essentially their own business, and it relieved the company from employer-employee relationships. In the plan, as worked out by his company, a specific territory is assigned to each driver and it is up to him to take care of customers and potential customers within that area. This plan, according to Mr. Lemons, has been very satisfactory.

Joe S. Vandemark, Purdue University, who has worked closely with

the association in developing agricultural icing, gave an interesting talk on its possibilities. The total volume from such business as corn icing, poultry icing, vegetable icing and other uses of ice for agricultural products, he said, is unpredictable. He warned the ice men against a bad example set by the frozen food industry which, during the period of rapid growth, failed on quality. The ice industry must not forget that lesson, he said.

He advanced the opinion that the State of Indiana offers opportunities for producing and processing frozen foods. The State has ample agricultural resources for this and it is much closer to the middle west and eastern markets than western producers. Truck icing also offers a good opportunity for ice plants located on main truck routes, particularly those on the road from Florida to Chicago and New York. This, he said, can mean a market for Indiana ice men of 100 or 200 tons of ice a day. The probable production of sweet corn in 1952 will mean a market of about 1500 tons of ice.

F. J. Henneberger, Princeton, offered the suggestion that "impulse" buying of ice could mean greatly increased sales. Much ice is brought from that impulse, he said, but to make free use of this market, the ice man must have ice readily available. The most logical outlet is through vending machines. Successful operation of vending machines, he said, requires a favorable location and attention to service problems, each vendor being an individual operation.

The group insurance plan offered to members of the association was explained by Richard Ratman, representing the insurance agency. This insurance which has been available to Indiana ice men for some months, offers life insurance, sickness, hospital and surgical insurance for all employees.

The National Association

Guy W. Jacobs, executive secretary of the National Association of Ice Industries, was the luncheon speaker Wednesday. Mr. Jacobs asked his audience not to be unduly discouraged because the ice industry is now going through hard times. They are not alone in this since many other major industries are having to go through similar adjustment.

He then reviewed briefly the work of the various departments of the National Association, pointing out the services rendered and the information that has been made available. The future of the ice business, he said, is sound and will continue to be a good business as long as a sincere effort is made to maintain high standards, sanitation, and appearance, aggressive merchandising and work for good public relations. Membership in the unit and national associations, he said, is necessary to make these efforts effective on state-wide and nation-wide bases.

John H. Glenn, Glenn Ice & Fuel Co., Beardstown, Ill., said that the greatest asset of the ice business now is the opening up of new ice markets, which have developed as a result of research by the National Association of Ice Industries. While domestic sales have greatly decreased, there is still a good market for commercial ice and new markets for prepared ice.

For future new business, he suggested that ice plants provide a basis for low-temperature storage of frozen foods. Other lines of merchandising include soft drinks, ice cream, dairy products, beer storage and dressed poultry. But, before taking on a side line it should be carefully examined to determine whether it would be depression-proof, whether it is an essential commodity, the probable competition, how long it will take to put it on a paying basis, public acceptance, how much working capital will be needed, availability of raw materials.

Merchandising Forum

The balance of the Wednesday afternoon session was devoted to a merchandising forum made up of short talks and discussions by leading ice men who have devoted considerable time to the subject of merchandising. The panel was conducted by H. L. Dithmer, Indianapolis.

B. H. Landing, Michigan City, pointed out that before starting a merchandising program, it is necessary to make a study of the business and determine what efforts offer the best returns for that area. He suggested that unless diversification offers special benefits it would be better to stick to the ice business. Mr. Landing also commented that vegetable icing will use more ice than meat on ice. If the grocer is sold on the use of ice, he will use plenty of it, he said.

Harold R. Dailey, New Castle, talking on the meat on ice program, said they had found it quite difficult to get their meat markets interested but they kept on going and finally sold sixteen on the idea. Of these, ten are permanent, four quit and two are using it on a trial basis. They had found in starting that retail meat dealers and grocerymen have an adverse opinion of ice and that they had to be convinced that it would be advantageous for them to use it.

Leland Lusk, Shelbyville, talking on the subject of diversification said that some years ago his company faced with a declining ice business, started selling stokers. Later they added gas and oil furnaces and gradually other equipment until now they have a complete heating department. Water heaters, electric washers and other appliances were added later. The business of this department is growing and shows an increase each year. It has worked very successfully for his company.

E. L. Trusty, La Porte, Indiana, pointed out that while vegetable icing is an established method among the better food stores, it is necessary for the ice man to go out and sell the idea to a new or prospective user and then each installation should be followed up to see that it is working properly.

Closing the discussion, Guy W. Jacobs said that they had heard about good merchandising where ice has been and can be developed. It means working at the job because this business won't come automatically. Your own market has the answer as to what the potential tonnage will be and what you will have to do to get it, he said.

Final Session

Following election of officers and directors, F. J. Henneberger, newly elected president, said there are big possibilities of improving ice markets, but the ice distributor will have to have ice available and keep it advertised. He suggested a program of establishing billboards on the highways and other key points.

Bringing the convention to a close, Richard Fischer, Fort Wayne, reviewed the high points of the talks made during the convention. Many ice companies throughout Indiana had been successful in selling meat markets on the use of ice in their counters. It can be done, but to do it you must tell a convincing story. You do not need an experienced salesman to do this; all you need is to learn the facts and then tell them. They will be interested. The ice industry has a convincing story and all it needs is that it be told.

The following new directors were elected: B. H. Landing, Michigan City; Leonard Swartz, Indianapolis; C. D. Knight, Terre Haute; Leland Lusk, Shelbyville; Clark Huthsteiner, Boonville.

Illinois Ice Men Vision Broader Market At Annual Convention

AN INTERESTING convention was held, as usual, by the Illinois Association of Ice Industries at Springfield, March 19, 20 and 21. The attendance was excellent, also the interest. The speakers and the entertainment produced a program that really "clicked." Everyone present returned home happy and feeling well repaid for the time, effort and money spent. Activities got under way Wednesday evening with a cocktail party followed by a buffet dinner, with music and entertainment. The annual banquet, Thursday evening, was a very enjoyable affair with good entertainment following the dinner.

The business part of the convention opened Wednesday forenoon, with an address by President James Stublefield and a report by Secretary-treasurer Wm. D. Wright.

C. P. Austin, director of the Research and Engineering Department of the National Association of Ice Industries reviewed the work of the Department for the past year and gave an outline of proposed activities for the current year. He mentioned the vegetable icing, corn icing and meat-on-ice programs as of particular interest in these times of searching for new ice markets.

John R. Porter, Swift & Co., gave a complete report on broiler growing. There is a definite interest in this new idea in chicken raising, particularly in the poorer agricultural sections, and where poultry processing plants are located, it provides a good market for ice from local ice plants.

Paul Hoff of Milwaukee discussed the recent addition by his company of a rebuilding and service department for automobile batteries, using the new battery ADX2 treatment. Mr. Hoff is well pleased with the results and says it offers a good opportunity for many ice companies to get into a profitable sideline.

Opportunities for Ice

The Thursday afternoon session was devoted to a discussion of new opportunities for ice, covering the subject of corn icing, hydro cooling of peaches, and meat on ice.

Richard C. Muckerman, City Products Co., St. Louis, discussed the practical opportunities offered in the sale of crushed ice for meat counters. Mr. Muckerman told how this new business had developed in the ice industry and said that it offered an opportunity for ice men to contact their local meat markets and establish the use of crushed ice for fresh meats.

B. Hartline gave a resume of the results of the sweet corn icing project carried on during 1951 in the Anna-West Frankfort district in Illinois. Mr. Hartline plans to inaugurate a new project this season—the hydro-cooling of peaches, centered in the orchard section of southern Illinois. The Illinois Association of Ice Industries will cooperate in this work.

George W. Heath of the Oscar Mayer Co., Madison, Wis., told about his experience with vending machines, of which his company has thirteen in service in and around Madison. He said that probably the most important element of their success is that they must be placed in a good location.

Final Session

At the final session Friday morning, the subject of diversification was covered under the general theme of "What Can I do with My Ice Plant?" Acting as moderator of this session was John H. Glenn, Beardstown, Ill., who has a unique and pertinent ability to interpret and express the modern problems of the ice man.

Reports from ice industry members of the panel who have already added diversified lines to their ice operations, developed some practical "do's and don'ts", the advantages and disadvantages were thoroughly aired and discussed and elicited much worthwhile information. On the technical side, Gene Rytlewski of Westerlin and Campbell Co., Chicago, and A. P. Riggins, of Armstrong Cork Co., St. Louis, Mo., were very helpful in the field of conversion of existing facilities, particularly in that of low temperature storage, demand for which is constantly increasing. Other members of the panel were Earl Prince, Sterling, Ill.; C. P. Austin, Washington, D. C.; and L. H. Summers, Bloomington, Ill.

Illinois Officers—1952

Honorary President, Paul R. Barboro, Jefferson Ice Co., Chicago
President, Horace R. Tolle, Citizens Coal & Ice Co., Mattoon
Vice President, John T. Purcell, Jr., Murphysboro Ice and Cold Storage Co., Murphysboro
Secretary-treasurer, W. D. Wright, Clinton

Directors Elected

The following directors were elected: James Stublefield, Cairo; J. P. Maguire, Decatur; George Rettof, Streator; Frank Pereboom, Jerseyville; W. D. Graydon, Chicago; John Purcell, Jr., Murphysboro; Horace R. Tolle, Mattoon; James Oldani, Springfield; Harold T. Smith, Champaign; Everett Smith, Anna.

Eastern States—Virginia Joint Convention

A JOINT annual convention of the Eastern States Ice Association and the Virginia Ice Manufacturers' Association was held at the George Mason Hotel, Alexandria, Va., March 20 and 21.

With a good attendance, the usual reports and papers were presented, officers were elected and other business was transacted. Guy W. Jacobs, executive secretary; Wm. T. Jobe, legal counsel and Frank Timmons, advertising and publicity, represented the National Association of Ice Industries. Other outstanding talks were presented on poultry icing, meat on ice and vending machines.

The annual banquet, followed by entertainment and dancing was held Thursday evening.

For the first time in many years, Samuel Freer, secretary-treasurer of the Eastern States Association was not present because of ill health. His resignation was accepted with regret, and to fill his place R. H. Wilson of the Quaker City Cold Storage Co., Philadelphia, was elected. Other officers were elected by the Eastern States group as follows:

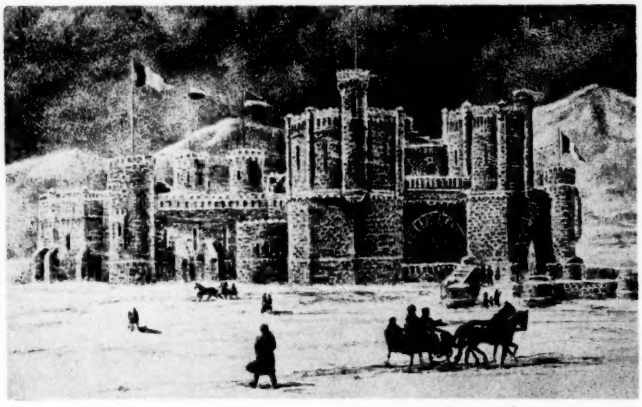
President, H. Hammond Snyder, Alexandria, Va.
Vice - President, Aubry Bowen, Binghampton, N. Y.
Vice-President, George O. Hendrickson, Salisbury, Md.
Vice - President, L. E. MacIntire, Chester, Pa.

Officers of the Virginia Ice Manufacturers Association were re-elected as follows:

President, J. C. Epley, Charlottesville, Pa.
Vice-President, J. F. Elliott, Jr., Charlottesville, Va.
Vice-Presisdent, W. M. Land, Norfolk, Va.
Secretary-treasurer, H. H. Snyder, Alexandria, Va.

Fabulous Ice Palace of the Nineties A Glittering Spectacle

IN THE warm April of 1896 there melted to the ground in Leadville, Colo. one of the wonders of the western world—a palace made entirely of ice, according to a feature article by H. O. Halleck in the Empire Magazine of the Denver Post.



Leadville's famous ice palace—Painting by Herndon Davis.

This massive structure was built on Capitol hill on the west side of the city between Seventh and Eighth streets covering five acres of ground. The architecture was in Norman lines having all the arches and buttresses and battlements of a medieval citadel. Within this huge ice castle, the monotony of plain walls was relieved by projecting blocks which circled about the place, and by unusual paneling. The buttresses of hewn ice extending midway to the panels of the top, and the indentures and projections produced by towers and arches gave added variety.

The main towers on the north front were octagonal—ninety feet high and forty feet in diameter and 120 feet in circumference. They formed the main feature of ornamentation of the building. They were decorated by turrets on the eight corners of the octagon and with paneling and imitation battlements.

The walls were eight feet thick and 5,000 tons of ice were used in construction.

The idea of erecting this massive structure was evolved by the citizens and businessmen of Leadville as early as 1890. From time to time various organized members met to discuss plans to finance its building. Finally E. W. Senior was appointed secretary and director general, backed by 155 prominent citizens and businessmen to raise the money.

Failure to raise $10,000 caused Senior to resign his position. Tingley S. Woods accepted the position under the name of the Crystal Carnival association. Careful inquiry was made as to the cost of ice palaces at Montreal, St. Paul, Quebec, and Toronto. From this research it was decided at least $20,000 should be in the treasury before work was started.

These funds were raised and plans went forward for laying out the grounds. Ice was cut by a large crew of men under the direction of H. C. Cole, who was owner of the Leadville Ice & Coal company at that time. Blocks of ice were hauled from various lakes surrounding Leadville and some were hauled by rail from Palmer Lake. Two hundred and fifty men were employed in this venture.

Work was started Nov. 1, 1895 and ice was trimmed for the building by Canadian woodchoppers. Stonecutters, first employed, were entirely too slow.

On Jan. 1, 1896 Leadville Ice Palace was dedicated to the public at a cost of $140,000. Tingley S. Wood the man who was instrumental in erecting it gave the address at its dedication. It was the most wonderful structure of ice ever erected in the United States.

The interior gave one the feeling it was a regal palace. The ballroom off the entrance of the main door you first approached. This room was eighty feet long by fifty feet wide. Beyond this was the skating rink which was 190 feet long by eighty feet wide. There was an auxiliary ballroom, also restaurants, bars and concession places. In each and every room lounges for ladies and gentlemen were comparable to those of the finest entertainment places.

The broad sweep of the icy walls inside was relieved by projecting blocks encircling the interior, and by unusual panel effects. These nitches and indentures provided space for sculptured art in ice, which illustrated typical life in the western hills—a miner with hand raised holding ore an old prospector, cudgel in his hand, prodding the burro to extend itself. Close by was a rabbit frozen in the ice. A bear and cubs were frozen in the ice, too.

Restaurant meat cuts, game and fish were likewise frozen in the ice, to draw the hungry inside.

The statue at the main entrance signifying Leadville was a figure of a woman carved in ice, with hand and arm extended. The hand pointed to the direction of the great Mother Lode Veins of the Cloud City. On her arm was a scroll with figures raised, telling the smelter returns of the value of wealth taken from the mines to that date, which was two hundred million dollars. This statue was nineteen feet high and mounted on a base of ice twelve feet high.

Double hand, hard rock drilling contests, with teams from western mining camps, competed for lucrative prize money for the deepest hole drilled in fifteen minutes. All contests were held inside the palace.

There was no night in Leadville during the ice palace carnival. The toboggan slide concessions were awarded to local resident H. C. Dimick, who built the large chute that sent the passengers from the palace to Harrison avenue and back, approximately five city blocks long.

All that is left of this wonderful Palace of Ice is simply a memory for those who were here in those gay days. They tell it to their children and emphasize the wonderful music they danced to all night; the wonderful brilliance of the many hundreds of electric lights.

Old King Frost, who forsook those generous people that year, the oldtimers will never forget. Nor will they forget the days when old Sol rode roughshod over the glittering walls of ice destroying their beauty, so that by April it was melted.

Such balmy winter weather never before had visited Leadville, and all investors lost heavily.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

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Factors Which Affect The Air Conditioning Load

DONALD L. GLASPIE

AIR Conditioning, as defined by the American Society of Heating & Ventilating Engineers, is "the simultaneous control of all, or at least the first three of those factors affecting both the physical and chemical conditions of the atmosphere within any structure. These factors include temperature, humidity, motion, distribution, dust, bacteria, odors and toxic gases, most of which effect in greater or lesser degree human health or comfort."

From this definition, we see that the temperature and humidity will directly affect the air conditioning load, whereas the air contaminators will indirectly affect the load through the ventilation rate. Therefore, in our discussion today we will focus our attention on the factors which will directly affect the air conditioning load.

The total heat involved in an air conditioning load is divided into two parts; namely, sensible heat and latent heat. Sensible heat is defined as that portion of heat which changes only the temperature of a substance. Latent heat is that portion of heat involved in a change of state. Heat is a form of energy that is transferred by virtue of a temperature difference or a change of state. Cold cannot be added to a substance, but heat can be removed from that substance to make it cold.

The above definitions can be stated in another way which may be more practical to our way of thinking, like this: Sensible heat is that amount of heat which is removed when cooling a substance to a lower temperature or that portion of heat added to raise the temperature of a substance. Latent heat is that portion of heat removed from the water vapor in the air in order to condense it to a liquid, which is called the latent heat of vaporization.

An N.A.P.R.E. Convention paper.

Heat Involved

The total heat involved in an air conditioning load is directly affected by the following:

1—The heat transferred through the enclosing structure; namely: walls, windows, doors, ceiling, skylights and floors.

2—The heat emitted by occupants.

3—The heat generated by lights, motors and appliances.

4—The heat transferred by the products of a manufacturing process.

5—The heat received from the sun's rays.

6—The heat transferred by the introduction of ventilation air.

To estimate an air conditioning load, you must first determine what the design conditions are to be. That is, what temperature and humidity must be maintained in the conditioned space and what temperatures and humidities are surrounding this space.

Before you can say what the inside condition should be, you must determine whether the system is to be designed for employee efficiency or for some manufacturing process. With this question settled, then you can go to authoritative sources to find the recommended conditions to maintain within the conditioned space. Table 1* gives the illustrative temperatures and relative humidities applicable to industrial air conditioning. From this table the inside conditions may be selected to satisfy the requirements of the space to be air conditioned.

Outdoor climatic conditions and suggested design temperatures are given in Table 2 for various locations in the United States. This table will aid you in determining the ambient temperature and humidity. Remember that Table 2 applies only for exterior walls. If the space to be conditioned is bounded on at least one

*For Tables, see references at end of article.

side by a space having other than outside conditions, then this must be taken into consideration when you calculate the load.

Another factor which must be determined before the load can be calculated is the ventilation rate. Local codes and ordinances quite often specify ventilation requirements for occupied and industrial spaces. In Table 3 is listed the recommended and minimum ventilation rates for the most common applications. If you will follow the recommended rates you will maintain a healthful atmosphere in the conditioned space.

Calculating The Load

Now that we have the design conditions and the ventilation rate established, we are ready to begin calculating the load. An air conditioning load consists of both sensible and latent heat. The sensible heat load consists of the heat flowing through walls, floor and ceiling; as well as heat emitted by people, lights, motors, appliances, products in a manufacturing process, the sun's effect and outside air. The latent heat load consists of the water vapor emitted by people, steam apparatus, food, products and outside air.

With this in mind, we shall begin our discussion of the internal sensible heat load with the heat flow through walls, floor and ceiling. In Chapter 9 of the 1951 ASH & VE Guide is given various tables which list the heat transmission coefficient, commonly known as the "U" factor, for all the common types of construction. As you know, the rate of heat flow varies according to the resistance of the substances involved. The greater the resistance, the less the heat flow. The "U" factor is the inverse of the resistance. The greater the resistance, the smaller the "U" factor. The heat load for the walls, ceiling and floor is calculated as follows: Multiply the surface area in square feet by the "U" factor then multiply by the difference between inside and outside temperature in degrees Fahrenheit.

The heat emitted by people is given in Table 4 which lists the rates for both sensible and latent heat gains. You must determine the proper degree of activity which applies and then multiply the sensible heat rate by the largest number of people which will occupy the conditioned space at any one time. This will give you the sensible load for the occupants. The electric light load is determined by multiplying the total number of lights (in watts) which will be used by 3.4 (Btu-watt) which will give you the amount of cooling required to take care of the lights.

The cooling load for appliances can be figured by referring to Table 5, which gives the sensible and latent heat rates for various common appliances. Then the heat load is found by adding the rates for each piece of equipment. The heat load for electric motors is determined by multiplying the name plate horsepower rating by 2545 Btu/h.p. This will take care of the motor load.

In calculating the amount of heat transferred to the space by the sun, we must consider the time of day at which the maximum air conditioning load occurs. This is required because of three reasons: (1) The amount of heat transferred through the windows vary, depending upon the angle at which the sun's rays strike the surface. (2) A time lag is encountered when the sun's heat is transferred through the walls and ceiling. (3) The internal load may vary to such an extent that the overall cooling load may be the greatest when the sun's effect is the least or vice versa. Therefore, time is an important factor when calculating an air conditioning load.

In Table 6 is given the instantaneous rates of heat gain due to solar and sky radiation for single sheets of unshaded common window glass. In Table 7 is given the effect of shading upon the instantaneous solar heat gain through single thickness of common window glass. Now to calculate the sun load on the windows, multiply the square foot of exposed surface by the correct factor from Table 6 then multiply by the correct factor from Table 7.

For the sun load on the roof refer to Table 8 which lists the total equivalent temperature differentials for calculating heat gain through sunlit and shaded roofs. Substitute the factor from Table 8 instead of the temperature difference used when calculating the heat gain through the ceiling. This gives the combination load which includes the sun effect and the heat transmission load on the ceiling. This, of course, would not be the case if there was another floor above the conditioned space, and hence no sun load.

The above calculations are all that is necessary for the internal sensible heat load on the average commercial installation; however, for an industrial application it is necessary to include the heat given off by the products involved in the manufacturing process. The product load is calculated as follows: The weight of the product in pounds per hour multiplied by the specific heat of the product which is then multiplied by the temperature difference involved to cool the product to the room temperature. See Table 9 for the specific heats of various products.

If you will add up all the above portions of heat which have been calculated you will have the total internal sensible heat load. Now that we have this section of the load calculated we will focus our attention on the calculation of the internal latent heat load.

Internal Latent Heat Load

The internal latent heat load consists of the amount of heat required to condense the water vapor in the air which is in excess of that amount required by the inside conditions of our air conditioned space. The moisture content of this space might be increased by the following: The perspiration from the people; the water vapor given off by steam apparatus, such as steam tables, coffee urns and other cooking appliances; and the moisture evaporated from products involved in a manufacturing process.

The latent heat load for people can be calculated by multiplying the maximum number of people in the space at any one time by the latent heat factor from Table 4. This formula is the same as the one used to calculate the sensible heat load of the people. The heat factors are the only variables. The number of people are the same.

The latent heat factors for appliances can be obtained from Table 5. These factors when multiplied by the respective number of appliances will give the latent heat load for appliances and steam apparatus. The appliances used are the same ones used to calculate the sensible load.

The above portions of the internal latent heat load are usually all that is involved in a comfort air conditioning load. However, in an industrial application it is sometimes necessary to include the moisture load received from the products involved in a manufacturing process.

Unfortunately, we are at a loss to determine exactly what this load should be due to a lack of information in this field. There are, however, a few certain fields in which this data is available. When an air conditioning load of this nature must be calculated, then someone connected with that industrial enterprise can probably assist you in determining this load.

The addition of all the above latent heat load calculations will give you the total internal latent load.

The outside air load is governed by the ventilation rate and the difference between outside and inside con-

ditions. The outside air sensible heat load is the amount of heat to be removed from the outside air to cool it to room temperature. The sensible load can be calculated by multiplying the amount of outside air introduced in cubic feet per hour by the specific heat factor which is 0.24 Btu per degree Fahrenheit per pound of dry air multiplied by the temperature difference between outside and inside design conditions in degree Fahrenheit, all the above divided by the specific volume in cubic feet per pound of dry air at the outside conditions.

The outside air latent heat load is the amount of heat removed in condensing the water vapor in the air to reduce the relative humidity to the inside design conditions. The latent heat load can be calculated by multiplying the amount of outside air introduced per hour by the latent heat factor of 0.15 Btu per grain multiplied by the difference in moisture content in grains per pound of dry air between the inside and outside conditions, all the above divided by the specific volume of air in cubic feet per pound of dry air at the outside conditions.

The values to be used in the above two formulas can be obtained from the psychrometric chart, if you have the design conditions and the amounts of outside air.

In Chapter 16 of the third edition of "Principles of Refrigeration" by W. H. Motz, you will find a lengthy discussion of the psychrometric properties of air and the use of the psychrometric chart. Since this book has been made available to most of you, I shall not go into a further discussion of the operation and use of the psychrometric chart.

Estimating Capacity

So far in this discussion we have covered only the basic method used in calculating an air conditioning load. Quite often we are faced with a situation where we must estimate or exercise an educated guess as to what capacity system will be required to do a certain job. This becomes quite useful from an engineering standpoint; because, when you are called upon to survey a place for air conditioning you can quickly approximate the load and can look for suitable locations for the equipment. You can also check the locations and capacities of their utilities. This can save you time by eliminating unnecessary return trips.

From a sales standpoint it becomes quite practical to estimate the size air conditioning system necessary for various reasons, a few of which follow:

1—Our potential customer may have in mind the amount of money which he can spend on the system. If this is true then you can estimate the capacity and can give him some idea of what his cost will be. Then you will soon know whether he means business or is just inquisitive.

2—If you can estimate the capacity required you will be in a position to plant some sales points in your prospect's mind which he might think about until your next call.

3—If you can accurately guess the capacity required to do a certain job, you will raise your prestige in the mind of your prospect. He may believe that you know what you are talking about.

To facilitate estimating an air conditioning load, I have compiled a list of equivalents, that is, the total heat load is expressed in a form with only one variable which can be used to quickly and accurately estimate an air conditioning load. These factors have been based on an inside condition of 80 F. and 50 percent relative humidity with an outside condition of 95 F. dry bulb and 78 F. wet bulb temperature. A wall composed of brick veneer, frame, 12 inch bricks, 8 inch cinder blocks or an inside frame partition will require 1 ton of refrigeration for every 2350 square feet of exposed surface. An 8 inch solid concrete wall will require 1 ton of refrigeration for every 1250 square feet of exposed surface. A ceiling insulated with 4 inches of rockwool (no sun effect included) will require 1 ton of refrigeration for every 10,000 square feet of surface. The same ceiling with 4 P.M. west sun effect included would require 1 ton refrigeration for every 2800 square feet of surface.

A double wood floor with a ceiling under would require 1 ton of refrigeration for each 3350 square feet. The same floor with no ceiling under it would require 1 ton of refrigeratiton for every 2350 square feet. A 6 inch concrete floor with no ceiling under would require 1 ton of refrigeration for each 1380 square feet. The same concrete floor with a furred ceiling under would require 1 ton of refrigeration for every 2350 square feet.

Single window glass with no sun effect will require 1 ton of refrigeration for every 730 square feet. The same window with 4 P.M. west sun effect will require 1 ton of refrigeration for each 80 square feet. 50 h.p. of electric motors will require 1 ton of refrigeration. 3400 watts of electric energy in the form of lights or heat will require 1 ton of refrigeration. 25 people doing moderately active office work will require 1 ton of refrigeration. 35 people seated at rest will require 1 ton of refrigeration. 14 people dancing moderately will require 1 ton of refrigeration. Outside air introduced at the rate of 300 cubic feet per minute will require 1 ton of refrigeration. The above equivalents are quite useful if used properly.

There are also other estimating factors that are fairly accurate if you use proper judgment in their use.

Estimating Factors

The following estimating factors have been established by Shelby-Skipwith, Inc., Memphis, Tenn.:

1—Average stores with two exposed walls require approximately 1 ton of refrigeration for every 300 square feet of floor space.

2—Average stores with three exposed walls require approximately 1 ton of refrigeration for every 250 square feet of floor space.

3—Average stores with all four walls exposed require approximately 1 ton of refrigeration for every 200 square feet of floor space.

4—Barber shops and beauty shops require approximately 1 ton of refrigeration for each chair or booth.

5—Theaters and auditoriums require approximately 1 ton of refrigeration for every 16 seats.

We can further group the various type average stores which usually have similar factors into a list which can be useful in estimating air conditioning loads.

1—Hospitals, institutions, eating and drinking establishments, including retail stores with lunch counters require approximately 1 ton of refrigeration for every 200 square feet of floor space.

2—Apparel stores, banks, drug stores and the first floor of department stores require approximately 1 ton of refrigeration for every 250 square feet of floor space.

3—Shoe stores and variety stores with no lunch counters require approximately 1 ton of refrigeration for every 300 square feet of floor space.

4—Food stores, hotels, offices and department store basements require approximately 1 ton of refrigeration for every 350 square feet of floor space.

5—Residences, apartments and upper floors of department stores require approximately 1 ton of refrigeration for every 400 square feet of floor space.

The above factors can be of great help to us if used wisely. I believe that all of you realize that the sun effect on any of the above listed stores

will vary widely, depending upon the direction they face. That is one of the reasons why the above factors are only approximate. The factors are used more widely as checking figures to verify the accuracy of your calculations. They help to detect mathematical errors.

You may verify the accuracy of the above estimating factors by noticing the relationship they have with your load calculations. By so doing you may establish a basis for exercising judgment in the future use of these factors.

You have been shown the method to be used in calculating an air conditioning load. You have also been presented the formula used to determine both the sensible heat and latent heat portions of the load. You have been given some factors which can be used for quick calculations. You have also been given a list of estimating figures which can be very helpful to you. I trust that you have gained information and knowledge from this discussion and will use it to the advancement of the refrigeration and air conditioning industry.

References

TABLE 1. 1951 ASH & VE Guide, Table 2, Page 259

TABLE 2. 1951 ASH & VE Guide, Table 1, Page 235-239 and Table 3, Page 261-264

TABLE 3. 1951 ASH & VE Guide, Table 4, Page 265

TABLE 4. 1951 ASH & VE Guide, Table 26, Page 303

TABLE 5. 1951 ASH & VE Guide, Table 27, Page 304-306

TABLE 6. 1950 ASH & VE Guide, Table 18, Page 280-281

TABLE 7. 1951 ASH & VE Guide, Table 25, Page 298

TABLE 8. 1951 ASH & VE Guide, Table 12, Page 280

TABLE 9. 1949, 6th Edition ASRE Data Book (Basic Volume) Table 7, Page 336-338

Chapter 9—1951 ASH & VE Guide

TABLE 6, Page 191—Coefficients of Transmission (U) of Frame Walls.

TABLE 7, Page 192—Coefficients of Transmission (U) of Frame Walls with insulation between framing.

TABLE 8, Page 193—Coefficients of Transmission (U) of Masonry Walls.

TABLE 9, Page 194—Coefficients of Transmission (U) of Brick & Stone Veneer Masonry walls.

TABLE 10, Page 195—Coefficients of Transmission (U) of Frame partition or interior walls.

TABLE 11, Page 195—Coefficients of Transmission (U) of Masonry Partitions.

TABLE 12, Page 196—Coefficients of Transmission (U) of Frame Construction ceiling and floors.

TABLE 13, Page 197—Coefficients of Transmission (U) of Concrete Construction ceiling and floors.

TABLE 14, Page 198—Coefficients of Transmission (U) of Concrete Basement floors on ground with various types of finish flooring.

TABLE 15, Page 199—Coefficients of Transmission (U) of Flat Roofs covered with built up roofing. No ceiling underside of roof exposed.

TABLE 16, Page 200—Coefficients of Transmission (U) of Flat Roofs covered with built up roofing. With lath and plaster ceilings.

TABLE 17, Page 201—Coefficients of Transmission (U) of Pitched roofs.

TABLE 18, Page 202—Combined Coefficients of Transmission (U) of Pitched roofs and horizontal ceilings based on ceiling area.

TABLE 19, Page 203—Coefficients of Transmission (U) of Solid Wood Doors.

TABLE 20, Page 203—Coefficients of Transmission (U) of Windows, skylights, and glass block walls.

N A P R E
Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

American Absorption System

Question No. 916: I should like to know why the American absorption system is not used, being so economical in operation in the production of ice when there are so many cheap sources of heat, (such as saw dust, steam exhaust, and other cheap materials), besides the less power required to produce the ice or refrigeration? — DR. JUAN ANTON, Santa Clara, Cuba.

ANSWER: The use of the absorption machine for ice making purposes in the United States began to wane when raw water ice replaced distilled water ice. The principal reason for its unpopularity is the objection to the steam generating unit which is necessary for the production of distilled water ice. Or to state the reason affirmatively, it is the general acceptance of electric or internal combustion engine power which makes the compression system popular.

Many years ago when steam had to be generated in order that it might be available for making distilled water ice the absorption machine competed favorably with the compression system. Even today where steam is available, the absorption system is considered as a competitor of the compression system, and the choice becomes a matter for careful consideration in which several factors must be weighed, such as:

(1) Comparative first cost

(2) Comparative operating and maintenance costs

(3) Temperature, quality and quantity of cooling water available. (It is a well known fact that the absorption machine requires considerably more cooling water. Furthermore the efficiency of the absorption machine is greatly improved, and its operating troubles reduced if the temperature of the water is less than 70 degrees F.

(4) Is ice making a major product of the plant or is it a by-product? If it is a by-product only, then the question arises as to whether the steam engines or turbines are operating condensing. If so, there is little steam available for operating the generator of the absorption system except that which is exhausted from auxiliaries such as steam pumps. This is true because the generator requires steam at pressures ranging from 2 to 8 pounds per square inch above atmosphere, whereas the exhaust steam from the engines or turbines should be at vacuum pressures ranging from 26 to 28 inches of mercury. In other words a power plant must operate condensing in order to be economical.

Many things could be said for and against each system. The absorption system uses heat as its source of energy, while the compression system uses power. Power in the United States is very reliable and the ice plant owner can usually buy it at a lower cost than he can produce steam heat in his own boiler plant when taking into account investment, depreciation, maintenance and operating costs. It follows naturally that the compression system is more generally used.—H. G. Venemann.

Mixed Brine Reading

Question No. 917: It will be appreciated if you could help me with a problem to which I cannot find the answer. The problem in question is on an ice plant worked by an ammona compressor (Frick). When the plant was first installed the initial brine charge was made with calcium chloride to correct strength but subsequently owing to the scarcity of calcium chloride and its high cost when available, the owners of this plant added common salt (sodium chloride).

Now I find that there is still a formation of ice on the evaporator coils even though the strength of the mixed brine reads 1.160 specific gravity at 60 F. I find from tables of these solu-

tions that calcium chloride at this hydrometer reading freezes at 3 F and sodium chloride at this reading freezes at minus 3 F. The percentage of sodium chloride used in comparison to calcium chloride is roughly 20 percent. The suction pressure (average) is approximately 16 lbs pressure, but the brine will not come below a temperature of 19 F; this I think is due to the formation of ice on the coils acting as an insulator.

Please let me know how I should take this reading? In addition, there is a suspected leak of ammonia in the evaporator oils. What test would you suggest making on the brine to be certain of this. You should bear in mind that there is a mixture of sodium chloride and calcium brine in varying percentage. It is also pointed out that no dichromate has been used. —RALPH B. WYLDE, Trichinopoly, South India.

ANSWER: Upon receipt of this question from Ralph Wylde, I answered it. My answer to the part about getting rid of the ice formation on the coils was evidently wrong, because he came back at me with this reply:

"Regarding your suggestion of adding more salt, I have tried this, and I find it makes matters from bad to worse, and the only way I overcome this difficulty is to get rid of all the old brine and put in fresh sodium chloride only, as calcium chloride is too costly. However, this is a problem for your research students and I trust you will pass the answer on to me when you get it. Once again thanks for your letter."

I had advised Mr. Wylde to keep adding common salt until the ice melted off the coils, and he tells me that I am all wrong. Evidently I am. So I would like the answer to this to come from the field of operating engineers who may have had a similar experience. In the meantime, I, too, am working on the problem.

It may be pointed out however that the freezing temperature of calcium chloride brine at 1.16 specific gravity and 60 F is 7 degrees F, instead of 3 F, and that of sodium chloride brine is minus 0.3 F instead of minus 3 F. These errors do not change the basic question.

In answer to the problem of ammonia leak in the brine, I told him how to prepare and use Nessler's solution with calcium chloride brines if the leak is small, and to use test paper if the leak is appreciable.

After I have heard from the members of the N.A.P.R.E. about mixing salt with calcium chloride brines, I will give you an answer from one of our Purdue chemists.—H. G. Venemann.

Use of Electricity

Question No. 918: We should like to have your opinion as to whether our electrical consumption to make a ton of ice is reasonable or otherwise. We have frequently read that the average ice plant in your country uses approximately 38 kilowatt hours to make a ton of ice but it has never been clear whether this figure covers all the electrical energy used in all the electrical equipment usually associated with an ice manufacturing plant. Our consumption averages 76 kw-hrs but this covers everything—200 ton daily store, 400 ton long term store, high pressure air agitation etc. In addition, the actual weight of water we freeze in the cans, to get a ton of ice after dipping and handling, is 2,200 lbs. The operating temperature in our tank is usually 10 F but we willingly accept this higher cost to get the added plus production from a smaller-than-ideal size of tank. Since 38 kw-hrs is just half our figure of 76 kw-hrs, you can understand our curiosity on this matter and we would, indeed value your comments. —J. A. BOELL, JR., Victoria, Australia.

ANSWER: I would say that your electrical power consumption is not far out of line with good practice in this country under similar plant conditions. Mr. Harry Sloan, in his treatise on the "Electrically Operated Ice Plant" which was published several years ago, cites a figure of 59 kw-hrs per ton of ice using 175 psig discharge pressure, 18 psig suction pressure and 12 degree brine.

His results when extrapolated to 185 psig with 10 degree brine would give 67 kw-hrs. These figures include power for compressors and auxiliaries and a day ice storage room. Of course his results were based on a 2000 lb ton after dipping and handling. Your figure of 76 kw-hrs would reduce to 69 kw-hrs if on the 200 lb basis, which would be further reduced by eliminating the long storage room.

Of course power consumption for any particular plant varies greatly throughout the season. A survey of 21 plants in the Chicago area in 1916 gave an average value of 47.9 kw-hrs per ton. These same plants ran as high as 59 during the month of July, and as low as 33 in February. Chicago is fortunate in having an abundance of lake water at 70 F for condensing purposes even during midsummer. I might state that the overall performance of ice plants have not improved much, if any, during the past forty years.—H. G. Venemann.

N A P R E Department

New Questions

Oil Pumping

Question No. 919: Which of three compressors pumping 3-stage on F 22 suction 27 in. vacuum first stage, suction 17 in. second stage, suction 35 lbs third stage and 170 lbs discharge pressure would tend to pump the most oil?—J. W.

Detecting Ammonia

Question No. 920: What is the simplest and best way to detect the presence of ammonia in calcium brine?—C. W.

Controlling Humidity

Question No. 921: What is the best way to control humidity in an egg storage room?—E. M.

News Notes and Chapter Activities

Rio Grande Valley

ARMIN DONEIS

AT ITS meeting on March 18 Rio Grande Valley Chapter concluded its study and discussion of the instruction material in the first section of the King Refrigeration Course dealing with the pressure, temperature, heat and liquid-vapor cycles in an ammonia refrigeration system under the able guidance of Instructor John Muller.

During the question period one member who had been troubled with undue heating of a newly poured outboard bearing on an ammonia compressor reported that by cutting additional oil grooves, by scraping the bearing for more clearance and by discarding the original oil chain in favor of a flat wide oil ring, performance immediately became normal.

He complained that at the speed this machine was operating the oil would cling to the outer perifery of the oil chain and ride it back down, instead of flowing off on to the top of the journal, thus starving the bearing for oil. The flat oil ring remedied this as the oil clinging to the inner surface of the ring was squeezed out between the ring and the top of the journal, thus assuring an ample supply at the entrance to the oil grooves.

During the business meeting President Clifford Musch appointed John Muller, A. M. Casberg and Ollie All-

bright as Nominating Committee to prepare a slate of officers for annual election at our meeting on April 28.

Instructor John Muller put the members of the chapter through their paces by quizzing them on the questions dealing with Section 1 of the King Refrigeration Course. In addition he elaborated on the answers given and showed how changing circumstances could alter conditions and require flexibility in operation and design. An informal discussion followed the quiz which benefitted all present at this meeting on April 1 in the Weslaco High School Building.

During the question period the matter of thread cutting, pipe dope, fittings and leaks came up for discussion. It was the consensus of opinion that by the use of sharp dies, with ample die lubricant used generously during thread cutting and with the use of a pipe wrench that isn't too long a leak proof joint can be produced with a minimum use of pipe dope. It was emphasized that too many pipe fittings are screwed up so tightly that the fitting is either cracked or distorted so that no amount of extra pipe dope could seal them off. With proper threads a tight connection can often be achieved without any pipe dope but just a slight amount of lubricant on the threads.

At the business meeting the Nominating Committee appointed at the previous meeting made a report on the slate of officers prepared for the annual election to be held April 28.

Los Angeles

FRED HERR

THE average refrigeration engineer is not fully aware that, if it were not for bacteria, the need for his services would be far less important to mankind than it is today, Dr. Sydney C. Rittenberg, assistant professor of bacteriology, University of Southern California, told members of Los Angeles Chapter, N.A.P.R.E., at the April 2 meeting in the Los Angeles Terminal Club.

Dr. Rittenberg made this statement to some 50 members of the chapter and several guests in a talk on "Bacteria in the Personal Affairs of Men." In the talk he cited the important role played by the refrigeration industry in combating bacterial growth, particularly in the fields of food contamination and food poisoning.

The program had been arranged by Ed L. Nelson of the Union Ice Company in line with Educational Committee Chairman Regis Gubser's plan of presenting a popular science talk by a selected university professor several times a year. While Dr. Rittenberg's talk, in the main, dealt with bacterial researches not directly concerned with refrigeration, he described the various manners in which refrigeration applies in combating bacterial attack and in contributing to research.

The speaker pointed out that bacteria in the personal affairs of human beings are found most pronouncedly in the realm of disease. It affects mankind most directly and is felt most severely in the field of food poisoning, the speaker said. He pointed out some of the problems with which the refrigeration industry is confronted in preventing food spoilage. He then discussed food poisoning in relation to modern refrigeration practices, with special emphasis on the role being played by the frozen food industry in controlling bacterial contamination in food products. The public health menace represented by improperly preserved foods was also discussed by the speaker.

While the foregoing points of discussion, which were, more or less, in the nature of "shop talk" to most of the members, were of considerable interest, Dr. Rittenberg actually had his audience on the edges of the chair when he moved on to the subject of bacterial research which has produced such tremendous therapeutic compounds as Salvosan, Streptomicin, Orio-micin and Penicillin.

With the fluency and facility characteristic of a competent lecturer, Dr. Rittenberg's naration of the researches which resulted in the world-renowned discoveries was, literally, a romantic tale of the adventures of the bacterial detective in the mysterious realm that lies beyond the range of the naked human eye.

He explained that bacteria have both a destructive and constructive side: The former as represented by their injurious affect in food spoilage, food poisoning and the creation of human diseases; and the latter, in that they form the basis for some of the most important thereapeutical treatments for human ailments, as well as a source of chemicals (alcohol from yeast, citric acid, etc.), and a source of food products (Limburger, Roquefort, Liederkranz cheese, etc), which are developed from bacterial molds.

The most personal effect of bacteria on mankind, Dr. Rittenberg declared, is in their invasion of the human body as causes of disease. He pointed out that 50 years ago bacteria were the major killers of mankind, whereas today they rank only eighth as causations of human disease. In 1900, he said, 32 out of every 100,000 persons affected with typhoid died. In 1948 the ratio was down to 0.2 persons per 100,000. He cited as reasons for this reduction of the typhoid death rate (1) better water due to filtration and the almost universal use of chlorination; and (2) improved sanitation in the food industry.

His narration of the trials and tribulations which lead to the ultimate discovery of Penicillin was absorbingly interesting. Refrigeration, he said, played a tremendously important role in the purification phases of the research into and production of Penicillin. Streptomicin and Oriomicin. Without recourse to modern refrigeration techniques, the cost of Penicillin, for instance, would probably be ten times higher than the present cost of $20 per 100,000 units, he said.

President Edgar M. Marrs presided over the business session. The applications of four new members and one re-instatement application were approved. The newcomers are J. E. Nosko and Marvin Newman of California Consumers Corporation; O. R. Reilly of the same firm, who was reinstated; Kenneth Brooks of Terminal Refrigeration Company, and E. A. Miranda of Quality Packing Company.

Ralph M. Moore of the Membership Committee gave a run-down on totals thus far in the membership drive. He revealed that 19 new members, including the five inducted that evening, have been enrolled thus far in 1952, with Donald Byl again leading the parade with eight to his credit.

Ray Burnett, committee chairman, then made one of his characteristically vigorous appeals for more action in the campaign. He pointed out that Dallas Chapter has become a serious threat to Los Angeles hopes of regaining the national membership pennant. He described the Texans as " . . . all steamed up and hurling defiant challenges at Los Angeles, Chicago and New York chapters, and anyone else they can get to listen to them." Burnett's suggestion was that Los Angeles Chapter ". . . take those ambitious Texans down a peg or two and show them what some real action is."

Treasurer E. T. Quinn reported a gratifying response to payment of chapter dues. He disclosed that more than 200 members have already paid up for 1952, a total which had never before been attained so early in the year.

The 1952 issue of the chapter's Program and Membership Index was distributed late in March. This handy volume lists the name, address, business firm, home and business phone of every member of Los Angeles Chapter on the rolls when the booklet went to press. New information this year gives each member's year of joining and whether he is a transferee (T), reinstated (R), or honorary member (HM). Other information consists of the complete educational program for 1952, from January uary 16 to December 17; and a listing of current officers and past-presidents. A section in the back lists names and addresses of the 32 members of Colton, Calif., Chapter.

The March 19 meeting was "Valve Night." The educational period featured a doubleheader talk on valves, R. S. Dawson of the Henry Valve Company discussed "Design and Installation of Relief Valves," and demonstrated their operation with various sample valves. William Krack of the Sporlan Valve Company talked on "A New Type Side Float Control", in which he discussed his firm's Thermal Valve, recently announced in ICE AND REFRIGERATION.

The preliminary class, which was held from 7:00 to 8:00 p.m., also emphasized the valve theme, with Instructor Jack Snyder using expansion valves as his subject. Mr. Krack presented a film on Sporlan valves. Under Mr. Snyder's competent direction, the preliminary class has shown a gratifying increase in attendance since the first of the year. The 23 students present at the March 19 class indicates the substantial attendance the classes are attracting.

The application of membership transfer of C. H. Hunter from Tennessee Chapter No. 1 (Memphis) to Los Angeles Chapter was approved.

An invitation of the Electrical Maintenance Engineers' Association of Southern California offering the NAPRE guest space at its Sixth Annual Industrial Electrical Show was accepted. The chapter installed a booth at the show at which information on NAPRE was dispensed. A substantial number of refrigeration industry men from both the NAPRE and the ASRE attended the Show and Technical Conference, which were held in the Veterans' Memorial Building, Culver City, March 20, 21 and 22. Planned productive maintenance was the main theme of conference discussions.

Yakima

ELMER TOOP

WIVES of members of Yakima Chapter were guests of the chapter when women's night was observed with a dinner on March 12 in the United Marketers Room in the Holzinger Building.

The introduction of guests was handled by Guy Stoutenburg, chapter president. Elmer Toop entertained with motion picture films on engineering. Luther Stewart, chairman of the committee on arrangements was assisted by Seth Drake and Emil Wahlstrom. E. J. Boyer with Mrs. Boyer drove 175 miles from Underwood, Washington to be with us at this dinner. Another affair is planned for the fall as the ladies seemed to enjoy themselves tremendously.

Detroit

L. L. ADAMS

THE meeting announcement of Detroit Chapter for April 15 started off with—"So You Think You Know How To Fish!" Well don't be too sure. The famous 'Muskie' fisherman and sportsman, Percy Haver will be there in person to show us a movie on Canadian Fishing and some wild animal life. The chapter anticipates that it will have practically a hundred percent turnout for this attraction." Members who attended were of the opinion that the program came fully up to expectations.

On Saturday, April 19 the chapter was invited to a plant inspection of Acme Industries, Jackson, Michigan, followed by a reception planned by Acme. A report on this plant visit will be made in the next issue.

Fort Worth

JOHN WISEMAN

FORT WORTH CHAPTER is reorganizing and anticipation is high to increase our membership tremendously. There are many new men in Fort Worth who can help in this work. Tom Threadgill is conducting our educational programs and doing a magnificient job. Great enthusiasm is being shown for the Guy King Refrigeration Course and all of us think it is tops.

as follows:

Recently new officers were elected

President, W. D. Wheeler.

Vice President, C. W. Harnist.

Secretary, Treasurer, John W. Wiseman.

Chicago

WM. L. TIFFIN

THE meeting of Chicago Chapter of April 8, was called to order by President Ed Garnaas for what turned out to be one of the most profitable meetings of the year. Prof. H. G. Venemann of Purdue University, Professor of Refrigeration was the guest for the evening. His talk concerned the N.A.P.R.E.'s part in the training of young engineers. His talk pointed out, as we all heard before, that there is at present a great shortage of trained engineers, and in the very near future this shortage will become much more acute.

The N.A.P.R.E. should do its part in encouraging young men to stimulate their interest in the field of operating engineering. The importance of the sales engineer's relationship with the operators was very well illustrated by several of Prof. Venemann's own experiences. In his early days as an ice plant operator, valuable experience was gained and which served him well later when engaged in the sales engineering field. Several specific stories were related whereby the confidence of an owner was won through giving help on operating problems.

Men who start out in the sales field without practical experience are going to have to get this experience somehow and it is usually the hard way to do it. One good way of getting this experience is through association and attending the meetings of the NAPRE regularly.

The refrigeration instruction course was handled by Eugene Rytlewski and we had a lot of discussion concerning both lubrication and valves for both the low and high speed compressors.

The meeting was closed with a doughnut dunking contest in which all members participated extensively. The contest ended a draw and all members received their prize of nightmares from eating too much.

Stockton-Modesto

HARRY DYER

THE second March meeting of the Stockton-Modesto Chapter was held at the Santa Fe ice plant in Stockton. Educational Chairman C. C. Berkley continued his lecture on the new Refrigeration Course. As mentioned before this new course is creating a lot of enthusiasm and there is a good turnout at the meetings. Everyone in the Stockton-Modesto group is getting a great deal out of this course.

At the present time with asparagus and celery moving in the valley we are quite busy and it looks like another good year for potatoes also. Most of the plants are either preparing for the coming season or doing repairs and maintenance so it is difficult to have everybody present at the meetings. At our first meeting in March Charles Andreoli was welcomed to membership. Mr. Andreoli is general foreman for the AT&SF Railway Co., in Bakersfield.

Memphis

CHARLES CONLEY

AT THE second March meeting of the Memphis Chapter, our instructor H. L. Todd continued on expansion valves of the King Refrigeration Course. He used blown up charts to explain how the various tyeps of automatic expansion valves operate and how they are controlled.

At this meeting we welcomed the following to membership: Albert J. Mullins, assistant engineer Clover Farm Dairy, W. H. Egbert, Jr. assistant engineer Firestone Tire & Rubber Co., Lewis A. Giles, chief engineer, University of Tennessee Medical College and Clarence Carson, chief engineer, Union Planters National Bank Bldg.

At the first meeting in April H. L. Todd continued the study of the Refrigeration Course. He covered the various types of evaporators and their applications. There was a great deal of discussion on this subject. Our attendance continues to increase at each meeting. It is evident that the Refrigeration Course is stirring up more and more interest.

Colton

H. O. BONTER

THE April meeting of the Colton Chapter was held at the Santa Fe ice plant in San Bernardino. After a short business session the meeting was turned over to educational instructor, L. G. Schroeder. Assisted by F. J. Scherer, the main subject was booster compressor operation which led into quite a lengthy discussion in which all members of the group participated. This was a very interesting topic and is just one more reason why engineers should attend meetings regularly to take advantage of what is being offered at little or no cost. Guest at this meeting was C. L. Hooker, utility engineer for Exchange Orange Products Co. of Ontario, Calif. who was very much interested in the proceedings. At the close of the meeting there was the usual lunch.

Measuring Humidity and Testing Hygrometers

A NEW booklet on methods of measuring humidity and testing hygrometers, by Arnold Wexler and W. G. Brombacher, has been issued by the National Bureau of Standards as Circular 512. It consists of 18 pages and includes three illustrations and six tables.

For some applications there exists at present no satisfactory method for the measurement of the relative or absolute humidity of gases, and available information on methods and instruments for measuring humidity is scattered. This circular answers these questions.

Frozen Foods
*Reg. U. S. Pat. Off.
PREPARATION PACKAGING FREEZING STORAGE DISTRIBUTION DESIGN CONSTRUCTION EQUIPMENT

Effect of Temperature and Storage on the Quality of Frozen Citrus Concentrates

W. R. ROY
Director of Research
Minute Maid Corporation,
Plymouth, Florida

THE factors involved in control of quality of frozen citrus concentrate at plant level can be divided into two main categories, those influenced by the raw source material, and those influenced by the manufacturing process itself.

Very briefly, quality of the raw product depends on proper selection of the fruit, that is, its condition, state of maturity, overall flavor, variety, color, ascorbic acid content, and handling prior to arrival at the plant. These factors have been the subject of a great deal of study and research which has resulted in the development of methods of sampling and inspection, analysis of fruit as it enters the plant, and blending of fruit varieties, based on analyses, to attain a high quality and uniform juice.

Rigid Control

In the process of manufacture of the product, rigid control is exercised to maintain optimum flavor by the use of the best known methods of juice extraction and finishing, and by maintaining low (65-75) processing temperatures during concentration. Control is extended to protect flavor and physical condition by rapid handling to maintain flavor and prevent incipient cloud-break, by careful control of pulp content, by blending of product derived from other seasonal fruit varieties, by rapid freezing of the finished product, and by plant storage at sub-zero temperatures.

Since frozen citrus concentrates are not subjected to heat treatment at any time during the processing cycle, preservation of quality in the interval between production and consumption is entirely dependent on storage, distribution, and handling at the proper temperature levels. It has been established that for optimum retention of quality of frozen citrus concentrates, storage temperatures of 0 F. or below are essential. At this level, no deterioration has been found in any of the factors used to judge quality.

It must be emphasized that separation of frozen concentrated citrus juices is the subject of more complaints than any other one factor. The consumer is emphatically prejudiced against any product of this kind if it is abnormal in appearance due to separation, and more often than not rejects it "down the sink," as a spoiled product without subjecting it to flavor evaluation.

In concentrates stored as long as one year at 0 F or lower, there is no discernible change in flavor. At higher temperatures, up to 45 F., any flavor degradation depends on temperature and length of exposure. At temperatures above 45 to 50 F., bacteriological growth causes development, in time, of fermented flavors. If the product is held for two to three days at room temperature, fermentation will cause evolution of sufficient carbon dioxide to swell and burst the can.

Bacterial Action

Curiously enough, when concentrate is held at low temperatures, the number of bacteria decreases, because of the low pH of orange juice, concentration of the fruit sugar, which causes plasmolysis and the slightly bacteriocidal action of citric acid.

Fruit juice concentrates, because of their high content of dissolved solids, exhibit a greatly depressed freezing point. In addition, the freezing point is not sharp, but is progressive over a wide temperature range. For example, 42° Brix orange concentrate begins to "slush-freeze" at 18 F., and does not become truly solid until a temperature of minus 5 F. is reached, although it apparently is frozen solid at plus 5 F.

The net effect of this range of freezing is two-fold:

1—The greater enzyme activity at low temperature, in contrast with other frozen foods which are essentially frozen solid at comparable temperatures, is probably due in part to the greater motility of the mass as a whole.

2—Slowness in lowering temperatures in the 18 to 0 F range is due to the wide temperature range of latent heat in freezing. This effect is particularly apparent in concentrates which have inadvertently thawed or have reached temperatures above zero, during handling, when they are restored at zero storage, in which lowering of the temperature again to zero is exceedingly slow.

Loss of Temperature

Loss of temperature and retention of the product for very short periods (1-2 days) of, say, 10 to 15 F, does not appreciably injure the product. However, recovery of temperature, as pointed out above, is very slow. Most terminal storage warehouses are designed to "hold such a product at zero provided it enters the warehouse at zero, but not necessarily to reduce the temperature to zero of a product entering at higher temperatures. Obviously, it requires much more compressor capacity to freeze than to hold.

Space in frozen storage warehouses is valuable. As a result, cartons of concentrate are usually stacked in the cold storage rooms in solid stacks. The innermost cartons of such stacks, completely insulated on all sides by 4 or 5 cartons of product, are reduced in temperature very, very slowly. Thus if concentrate is allowed to warm to 15 or 20 F in a day or so while in transit, and subsequently stored at 0 F, some of the product in the center of the stacks might take weeks to return to zero. During this

Digest of paper presented at annual Frozen Foods Convention.

period degradation could occur to a measurable extent.

Some producers of frozen concentrate are conducting educational programs in an effort to teach shippers, warehousemen, distributors, retailers, and consumers the limitations of the product and best methods of handling it. Cooperation has been given carrier agencies in their research aimed at developing equipment designed to transport frozen foods at zero temperatures. Satisfactory low temperature truck and rail units are now being used in increasing numbers.

Work has been done and is being carried on to determine if heat at low level can be sued to inactivate enzymes sufficiently to yield a more stable product, without causing development of off-flavors. Most of this work is being done in the 140-160 F range.

Other research involves treatment with high frequency, high voltage electrons, use in ultra-sonic waves, and treatment with wastefission products to aid in stabilizing the concentrates.

Some progress is being made in stabilizing the products. Even if the industry suceeds in making a more stable product, however, the consumer will be assured of the best possible quality if the product has a history of zero or sub-zero storage from plant to table.

Frozen Cooked Foods and Complete Meals

A NUMBER of guests and members turned out to the February meeting of the Chicago Section, American Society of Refrigerating Engineers to hear Dr. D. K. Tressler, Scientific Director of the Food and Container Institute for the U. S. Armed Forces, who spoke on the "Freezing of Cooked Food and Complete Meals."

Although freezing is not new, the freezing of cooked foods has taken on new significance with the improvement of freezer display cabinets by the lowering of the domestic refrigerator ice cube compartment temperature from plus 20 to plus 10 degrees in 1938. Today a long list of cooked foods such as soups, creamed dishes, meats, poultry - creamed, minced or hashed, and many other specialties such as bakery products are being sold.

Cooked Foods Popular

The present day popularity of cooked frozen foods is due to several economic factors. They save time since preparation of the product is not necessary. They are of high quality and immediately available. They are convenient to have on hand for emergency use, in case of sickness or when the wife is away. They are also popular for institutional use in dining cars, ship lines, air line, submarine service and small as well as large restaurants and drug stores. They save labor time in the kitchen, they eliminate waste. Exact cost and profit control are possible, production cost may be lower because of factory production methods. They are labor and time saving for short order service.

There is no loss if the menu is held in the freezer as there would be if the food normally prepared could not be used if the customers did not appear due to bad weather, etc. Cooked meals were used during World War II for feeding personnel in long flights and they would be equally desirable for use on crowded transport ships, trains or in hospital evacuation. The services have not used them due to the difficulty of obtaining satisfactory equipment for thawing and heating; difficulty in handling, shipping and storage; spoilage due to improper handling and to poor quality of product because of lack of industrial experience and competition.

Lyons of England, he said, is operating a chain of frozen food cafeterias. These foods are prepared institutionally in a centrally located kitchen. They are packaged in aluminum trays, frozen and distributed to their chain of restaurants where they are reheated for serving. Their customers are not aware that they are eating frozen foods.

Although much has been accomplished, there are still many problems in the study of foods to improve their freezing and storage qualities. Freezing changes the texture of many foods, Some spices undergo flavor changes in storage. Sauces and gravies sometimes coagulate and no one should start packaging prepared food without carefully considering the effects of both freezing and storage.

An example of the institutional importance of cooked frozen foods can be seen in the recent article published in NEWS WEEK. Although railroad passengers complain about the high cost of dining car meals, the railroad loses $1.39 for every dollar spent by the passenger. This industry's total

loss last year amounted to $27,000,000 on dining car service.

The Chicago, Rock Island and Pacific Railroad was in the red about $1,000,000 on its dining car service last year, The answer has been found in frozen cooked foods and service is now being started on part of the roads' 8,000 mile route at prices 10 to 15 percent below the present price. The Chesapeake and Ohio is also starting a similar service.

Committee Studies Public Relations on Frozen Foods

AN EASTERN refrigerated warehouseman recently expressed concern over what he believed to be a widely held false impression by consumers that great quantities of frozen foods and other perishables go into refrigerated warehouses and remain there indefinitely. The problem was referred to the Public Information Committee of the National Association of Refrigerated Warehouses, first to check the experience of warehousemen in other parts of the country, and second to ask for recommendations as to corrective action, if any.

Committee members displayed a lively interest in the question and the consensus was that the problem was not as acute, on a national basis, as the Eastern representative had found it to be in his region. However, it was recognized that any misapprehension of the sort mentioned should be corrected wherever possible. In that connection, several remedies were proposed.

An advertising campaign, sponsored jointly by the refrigerated warehousing industry and frozen food people was suggested by several members. Institutional ads thus presented would stress the short life of frozen foods and underscore the fact that for this reason storage periods must necessarily be short.

New Warehouse-Frozen Foods Committee

A NEW Warehousing Committee of the National Association of Frozen Food Packers is now being formed. C. L. Snavely, president of the National Association of Frozen Food Packers has appointed Harold C. Emerson, Bridgeton, N. J., as its chairman. It is contemplated that the committee will consist of representatives from the frozen foods warehousing, packing and distributing industries.

Warehousemen and Packers Meet in Panel Discussion at Frozen Foods Convention

One end of the speakers table at panel discussion at frozen foods Convention. H. J. Nissen, Terminal Refrigerating Co., Los Angeles; L. A. Campbell, Pict Sweet Foods, Inc., Mt. Vernon, Wash.; J. I. Gallery, Quincy Market Cold Storage & Warehouse Co., Watertown, Mass.; John Goldsmith, John D. Dulany & Sons, Inc., Fruitland, Md.; H. C. Emerson, Cumberland Warehouse Corp., Bridgeton, N. J.; T. E. McCaffray, National Fruit Canning Co., Seattle; J. P. Johnson, Terminal Refrigerating & Warehousing Corp., Washington.

FROZEN foods packers, distributors and warehousemen swapped friendly punches in a lively panel discussion, "Operation Zero," sponsored by the National Association of Refrigerated Warehouses as a feature of the National Frozen Foods Convention in March at the Conrad Hilton Hotel in Chicago. The session prompted much favorable comment by convention delegates and panel members, alike. As reported in the April ICE AND REFRIGERATION, it was the first instance of formal participation by NARW in the Annual Frozen Foods show.

New Strawberries Replace Old Varieties

REPLACEMENT of commercial strawberry varieties by new and more suitable varieties, leaves only one in the top five now that was there 35 years ago, the U. S. Department of Agriculture has reported. That variety, Klondike, at the very top in 1916 and grown then on 28 percent of the total U. S. strawberry acreage, is now the low berry of the present high five. It is found on only about 5 percent of the commercial acreage. Of the 15 varieties that made up 80 percent of the acreage 35 years ago, only 4 are being grown commercially now.

The Department and several of the State experiment stations have originated most of the new and more suitable strawberries that make up much of the present list of commercial varieties: Blakemore (32 percent of the acreage) was originated by the Department in 1923; Klonmore (13 percent) by the Louisiana station in 1940; Catskill (3 percent) by the New York station.

Changes in the standing of varieties come rapidly as new ones of superior qualities appear. In a few more years, according to Dr. George Darrow, in charge of small fruit breeding at the Plant Industry Station, Beltsville, Md., much of the acreage will be devoted to varieties hardly known, or entirely unknown, at present.

Among those recently introduced are: Four resistant to the widespread red stele disease — Redcrop and Sparkle from the New Jersey station, Vermilion from the Illinois station, and Fairland from the U. S. Department of Agriculture and the Maryland station; three high-flavored berries — Fairpeake, Midland, and Suwannee — from the Department's plant breeders; Albritton, a firm glossy variety from the Department and the North Carolina stations; Sioux, a variety originated by the Department for the Great Plains that is hardy down to minus 40 F.; Brightmore, a very glossy berry well adapted for freezing, that the Department and Oregon introduced for growing in the Northwest; Arrowhead, a hardy variety from the Minnesota station; and Northwest, originated by the Western Washington Station.

In recent years interest in strawberry breeding has been growing at a still greater rate, and Dr. Darrow expects it to bring out additional superior varieties—better in flavor and aroma; bigger, so as to speed picking; firmer, so as to handle and ship better; some better adapted to freezing; others with flowers resistant to early spring frost and, therefore, productive of bigger berries, still others hardy enough to do well in regions of severe winter; and, of course, other varieties resistant to the destructive red stele disease.

Data on Frozen Foods

A PROGRAM to assemble data on nutritional values of frozen foods has been announced by the National Association of Frozen Food Packers. The program contemplates the collection of data already developed on frozen concentrated juices, and making plans for research projects which will yield data on other frozen food items, particularly fruits and vegetables.

Data which is available or becomes available as the program proceeds will be averaged and statistically analyzed, and the results will be widely disseminated.

New Frozen Food Brands

THE increasing popularity of orange concentrate has resulted in new brands coming into that market. One probability is that A & P will have its own brand for limited distribution this summer. Other new brands announced are Borden; Penn Mutual, a Philadelphia retail chain; Grand Union, under the Freshpak brand; Snow Kist Frosted Foods, a Jersey City distributor. The California Packing Co. (Del Monte) also is planning to enter the frozen food business starting with some items of the 1952 pack.

Frozen Fried Chicken

FROZEN fried chicken is gaining ground, according to a report by the Refrigeration Research Foundation, to such an extent that it may affect the general marketing picture for poultry. The process provides delicious quality, simple home preparation, and storageability. The writer was not, at that time, worrying about what the housewife will do with her spare time, as some may be; but made the point that they do believe in streamlining her activities.

ASRE Announces Informal and Technical Sessions for Spring Meeting

PROSPECTS are bright for a well attended and interesting meeting of the American Society of Refrigerating Engineers at the Biltmore Hotel in Atlanta, Georgia, June 1-4, 1952, according to an announcement by Program Chairman, Geo. K. Iwashita of General Electric Company.

Continuing the practice successfully followed the last few years, informal conferences on domestic refrigerator and air conditioning engineering problems will run concurrently with the technical sessions.

The subject of the domestic refrigerator engineering conference, Chairman, C. D. Harris, International Harvester Company, will be automatic defrosting which is now being incorporated in the refrigerator designs of most of the leading refrigerator manufacturers. The methods of accomplishing this desirable effect will be described by engineers from half a dozen different manufacturers. In addition, there will be a description of a new finish designed for facilitating water run-off and a discussion of control methods used in automatic defrosting.

Exhibit of Equipment

A decided innovation in ASRE conventions will be an exhibit of research and laboratory equipment of interest to and used by domestic refrigerator engineers. This will in no sense be a commercial exhibit but will be of interest especially to design engineers. Among the exhibits being considered are:

A new low cost Polystyrene design for deep drawing with a vacuum process; a new finish porcelain not requiring a cobalt ground coat; demonstration of a new Silicone finish that facilitates water run-off; demonstration of a method of observing motor winding temperatures during continuous operation; demonstration of new combination timer and defrost thermostat.

Packaged year-around air conditioners will be the subject of the air conditioning conference, the chairman of which is Paul B. Moore, of the York Corporation. To set the stage for the conference, an address on "A Review of Present and Future Markets for All Year Around Air Conditioners" will be presented by a well known utility executive.

This talk will be followed by three prepared discussions on the application of year-around air conditioners operated by gas, electricity, and combination gas and electricity, and the application of packaged air conditioners to existing forced hot air residential heating systems.

Although the regularly scheduled speakers at both of these conferences will present prepared talks, the discussions following them will be kept on an informal level and any members and guests who are interested are invited to participate.

Technical Sessions

Three regular technical sessions will be held on Monday, Tuesday, and Wednesday mornings, the afternoons being left open for committee meetings, inspection and sightseeing trips, golf matches, and other forms of recreation.

Among the papers being considered by the Program Committee for presentation at the technical sessions are a number of unusual interest to those engaged in the various branches of the refrigeration industry.

Some of those being considered are:

"Atomic Radiation as it May Affect the Refrigeration Industry" by Dr. L. E. Brownell of the University of Michigan. This is a follow-up report on the talk given by the author at New Orleans in December which provoked a lot of questions from interested refrigeration engineers and food technologists two or three papers on lubrication, selection and evaluation of oils for refrigeration systems; Fundamentals of Refrigerant Piping; Properties of Metals as Very Low Temperatures; a discussion of Pressure-Volume-Temperature Properties of the Freon Compounds; Thermal Electric Analogue, a method of determining heat transfer electrically; a description of a new Refrigerator Cabinet Heat Leak Calorimeter; Some Design and Construction Problems encountered in the erection of Tonnage Oxygen Plants; How Safety Provisions as exemplified by the B-9.1-1950 Safety Code may prevent accidents; and the Latest Methods Employed in Freezing Poultry.

Spurred on by recollections of the lavish hospitality extended by the local entertainment committee at the time of the December convention in New Orleans, the Atlanta convention committee, headed by Dr. J. G. Woodroof, Georgia Experimental Station, and C. T. Baker, consulting engineer, are arranging for a full entertainment program including the traditional ASRE dinner-dance, a barbecue at one of Atlanta's beautiful country clubs, golf matches, inspection trips to the Lockheed Aircraft plant and the Low Temperature Laboratory at Georgia Tech.

A reception will be given by ASRE President, Edward Simons, on Sunday evening following the meeting of Council at which refreshments will be served.

Luncheon for the ladies will be held at Mammy's Shanty followed by sightseeing trips to Atlanta's famous Cyclorama depicting scenes of the Civil War—1861-65, and the Wren's Nest, former home of Joel Chandler Harris, author of the Uncle Remus stories of "Brer Rabbit".

Erie Section, A.S.R.E.

A JOINT meeting of the Erie Section, American Society of Refrigerating Engineers and the American Society for Quality Control was held at the Erie Moose Club.

R. E. Wagenhals, director of quality control, Timken Roller Bearing Co., assisted by L. D. Rice, quality control engineer of the same company, discussed "Simple Demonstrations Explain Basic Quality Control Methods." A technical presentation on the quality control aspect of "Vacuum Insulation—Seal Testing" was given by J. B. Spooner and D. E. Frank.

The technical presentation emphasized the problems of moisture in insulation, the effects of moisture and why it should be controlled.

A.S.R.E. Elects Life Members

THIRTY years ago eight men joined the American Society of Refrigerating Engineers who have been members in good standing to the present day. At a meeting of A.S.R.E. council last December these men were elected to life membership in the Society. Those honored were Charles F. Belshaw, Greenville, Mich.; Ralph Copp, chief engineer of Meyer-Blanke Company; David L. Fiske, formerly national secretary of A.S.R.E.; A. G. Loeffel, Thermal Engineering Co., St. Louis, Mo.; J. C. Pereno, J. C. Pereno Engineering Co., Miami, Fla.; R. T. Shipley, formerly with the York Manufacturing Co.; T. G. Thurston, editor of The National Engineer and E. W. Townsley, C. M. Robinson Co., Cincinnati, Ohio.

New Light Weight Concrete

(Continued from page 33)

storage plant in Wisconsin, where it was used as a structural roof deck. It was reinforced with wire mesh and combined the two functions of structural and insulation in the one material.

This new material is manufactured and distributed by the American Bildrok Company, 2001 West Pershing Road, Chicago, Ill.

Montreal Warehouse Reports Good Year

MONTREAL Refrigerating & Storage, Ltd., reports results for 1951 were satisfactory. Net profit was $95,700 or $2.58 a share against 1950 net of $100,330 or $2.71 a share. These profits were after providing $120,040 for depreciation in 1951 against $30,940 in 1950 and making income tax provision of $109,580 against $69,190.

Cash dividends of $1.50 a share were paid in each year, requiring $55,500. Towards end of 1951 the company also distributed a dividend of $370,000 in $10 par 5 percent cumulative redeemable preferred stock, made possible by capitalizing surplus.

W. G. Lasher, president, states volume of goods for storage was almost at capacity for the first nine months of 1951, but fell off in the last quarter. The loss of tonnage, though relatively light, has continued into 1952, he adds. Current assets amounted to $305,950 and current liabilities to $192,890.

New Incorporations

Batesville, Miss.—Batesville Ice & Coal Co. Inc., has been granted charter of incorporation with capital stock listed at $20,000.

Little Rock, Ark.—Hosier and Company has announced erection of a new quick-freeze plant. It has one airblast freezer with a capacity of 80,000 lbs. and one immersion quick freezer with a capacity upwards of 200,000 lbs.

Sheboygan, Wis.—Sheboygan Cold Storage & Warehouse Corporation has been formed here with an authorized capital stock of 1,000 shares of common with par value of $100 per share. Incorporators are Lawrence G. Butler and Robert L. Rohde, the latter being the registered agent for the corporation at 1030 South 7th Street.

Seattle, Wash.—The Pacific Pearl Frozen Foods, Inc. has been incorporated here with capitalization of $50,000. Incorporators Ivar Wendt, Alice Huffman and H. W. Haugland.

Tupelo, Miss.—Tupelo Ice & Coal Company, Inc., has been granted charter of incorporation, listing capital stock at $50,000.

Book Review

HEATING, VENTILATING AND AIR CONDITIONING GUIDE, 1952 (30th) edition. Published annually by the American Society of Heating and Ventilating Engineers. 1520 pages. Heavy cloth binding. Illustrated. Price $7.50. For sale by Nickerson & Collins Company, Chicago 44, Ill.

The chapter arrangement of the past two editions has been retained, chapters being grouped under the familiar section titles: I Fundamentals, II Human Reactions, III Heating and Cooling Loads, IV Combustion and Consumption of Fuels, V Systems and Equipment, VI Special Systems, VII Instruments and Codes.

New codes of interest and latest editions of all codes have been included in the enlarged list of codes and standards. Names and addresses of organizations which can supply the codes and standards are listed for convenience.

One of the special features of this year's Guide is the larger catalog data section which contains accurate data and specifications on the latest products of the 277 manufacturers whose catalog data can be found on pp. 1099-1485. For the convenience of finding available types of equipment there is a 32-page index to modern equipment. This index lists the names of the manufacturers, according to the various categories, and gives the page numbers on which their catalog data appears. A cross index is provided for both the Catalog Data and Technical Data Sections.

MARINE AIR CONDITIONING AND REFRIGERATION. By Earl Shulters, U.S. Maritime Administration. Published by Cornell Maritime Press. Illustrated and indexed. 384 pages. Price $6.00. For sale by Nickerson & Collins Co., Chicago 44, Ill.

This book was written to bring to the user new, comprehensive and up-to-date coverage of design, construction, operation and maintenance procedures on all types and systems of air conditioning, conditioned air and refrigerating equipment now in marine service. The content is based on the author's 25 years' experience in the design, construction and operation of shipboard refrigeration equipment, plus the cooperation of other refrigeration engineers and manufacurers. It is geared to meet the needs of trained men in the design, construction, operation and maintenance of shipboard refrigerating equipment; as a reference book for design engineers and draftsmen, as a textbook for school classes, and as an operating manual for engineers abroad.

Book Review

THE ENGINEERS ILLUSTRATED THESAURUS, by Herbert Herkimer. Published by Chemical Publishing Co., Inc., New York. Illustrated. 572 pages. Price $6.00. For sale by Nickerson & Collins Co., Chicago 24, Ill.

This is a useful and comprehensive reference work that will be found valuable for technicians and students. The data pertaining to mechanical engineering and other engineering fields are arranged in a form suitable for quick reference. The graphic method of describing machine parts and their movement by means of diagrams, line drawings and photographs has been adopted as the most satisfactory means of providing a clear explanation. This has limited descriptive text to a minimum, which has made it possible to include a larger number of items within the limits of the book. Also it presents basic information without confusing irrelevant detail since the practical technician and student need only an outline of an idea and probably would resent elaborate explanations. The book contains more than 8,000 illustrations. The author has adopted a classification similar to that of Roget's Thesaurus of English Words and Phrases, in which a word is classed according to the idea it intends to convey. In addition there is an exhaustive alphabetical index in the back of the book. By consulting the classification first and then the index, the reader should readily find the information desired.

There were 384 separate research studies, or line projects, under way during the year on marketing research, services and education.

Sales and Reorganizations

Los Angeles, Calif.—The California Consumers Corp. has sold its ice manufacturing plant at 9348 Santa Monica Blvd., Beverly Hills. The purchasers, a syndicate headed by Attorney William Katz, plans to modernize the building for use as a deep freeze, cooler and refrigerated holding rooms.

Hattiesburg, Miss. — Mrs. Mellie Repsher of Meridian has sold her three ice plants here, one of them to Robert L. Touchstone and the other two to L. L. Lewis. Mr. Touchstone is using the one plant as a used car lot with office space in the building and Mr. Lewis is using the plant at Hardy and 11th for the production of ice while the other plant at Seventh and Main Streets will remain idle, maintained on a standby basis. Mr. Lewis operates ice plants at Bay Springs and Mendenhall.

Orange, N. J.—The former ice plant of the Mountain Ice & Fuel Company at 44-50 Oakwood Avenue, has been leased by Liebmann Breweries, Inc., from the Rubel Corp. The Louis Schlesinger Company was the broker.

Dairy Price Support Program Announced

SUPPORT prices and details of the dairy price support program for the coming year have been announced by the U. S. Department of Agriculture. The new program became effective April 1 following the expiration of the current program.

Prices of manufacturing milk will be supported at $3.85 per hundred pounds and butterfat at 69.2 cents per pound. The manufacturing milk support price is based on 3.95 percent butterfat (yearly average test). These prices are equal to 90 percent of the estimated parity equivalent price of manufacturing milk and of the estimated parity price of butterfat both as of the beginning of the 1952-53 marketing year. The 90 percent level of support was announced with the 1952 Production Goals for Agriculture released last November. This announcement provides the dollars and cents levels of support and purchase prices to carry out the dairy support program. (The parity equivalent price for manufacturing milk is 88.5 percent of the U.S. parity price for all milk sold by farmers at wholesale to plants and dealers.)

In announcing the details of the program, Secretary of Agriculture Charles F. Brannan said, "The maintenance of milk production during the coming year is one of our important agricultural objectives. Milk cow numbers have been declining since the end of the war and, despite increased output per cow, production has not kept up with the needs of our increasing civilian population and defense program. Milk production in twelve of the last fifteen months has been below the level of a year earlier and the milk supply per person in the United States is now at a record low level.

In carrying out the support program for the coming year, the Department will offer to make carlot purchases of dairy products in the United States during the period April 1, 1952 through March 31, 1953 at the following prices:

Butter: U.S. Grade A or higher 67.75 cents per lb; U.S. Grade B 65.75 cents per lb.

Cheddar cheese: U.S. Grade A or higher 38.25 cents per lb.

Nonfat dry milk solids: Spray process 17.00 cents per lb; roller process 15.00 cents per lb.

Department officials pointed out that the new support prices for milk and butterfat are below recent market levels and will not cause a general increase in consumer prices of dairy products. Consumers will be benefitted to the extent that the program maintains milk production. Also, any products which might be purchased under the program will be available for sale back into domestic trade channels and will help to stabilize market prices during periods of seasonally low production. The value of such sales was illustrated in 1950 and early 1951 when Commodity Credit Corporation sold back more than 140 million pounds of butter, and additional quantities of cheese and nonfat dry milk solids, into domestic trade channels, to the benefit of consumers during months of seasonally low production.

Because of the strong demand for dairy products during the past year, market prices were above support levels most of the year and very little support buying was necessary. CCC has no stocks of butter and cheese at the present time. As a result of additional sales of nonfat dry milk solids back into domestic trade channels during recent months, CCC stocks of this product have been reduced to less than 5 percent of the quantities purchased during the past three years under the price support program.

Canadian Mechanical Refrigerator Sales Down

FEWER mechanical refrigerators were produced in Canada in 1951 than in the preceding year, while manufacturers' year-end inventories were larger, the Bureau of Statistics reports. Month of December output was also below a year earlier. The year's output of domestic-electric refrigerators amounted to 276,611 units against 346,608 and the December total was 6,600 units against 31,335. Stocks of electric refrigerators totalled 45,204 units against 34,435 a year earlier. The year's imports of electric refrigerators, domestic or store type, amounted to 109,624 units as against 11,088, and exports numbered 3,263 units as against 2,350.

Production showed a further decline in January this year as compared with a year earlier, according to figures compiled by the Dominion Bureau of Statistics. The month's output of electric refrigerators totalled 8,340 units—less than a fourth last year's January total of 34,694 units. Shipments in January fell to 9,057 units as against 33,235 while stocks at the end of the month were up to 46,054 units from 4,346. Imports amounted to 1,104 units as compared with 8,824 in January last year.

Refrigeration in England

THAT refrigeration is featured in a large proportion of public exhibitions in these times proves how more and more indispensable it is becoming in the social and industrial life of the nation, says "Modern Refrigeration" of London, England. At the 1952 Hotel, Restaurant and Catering Exhibition the domestic and commercial sides of refrigeration were well represented.

Canadian Ice Machine Reports Increased Orders

REFLECTING the expanded scope and uses of refrigeration and air conditioning, Canadian Ice Machine Co., Ltd., booked a record total of orders in 1951 at $3,687,788 up 28 percent from 1950, the annual report reveals. By far the largest share of the increase came in orders for industrial air conditioning and machine installations, H. V. Shipley, president, states. Government restrictions on the use of steel for construction of cold storage warehouses, breweries, skating and curling rinks, and the depression in the dairy industry, held business from these regular users far below normal, he says.

The company entered 1952 with a backlog of $1,447,210 the largest in its history. Sales in 1951 were at a record of $3,687,788 compared with $3,146,500. Net profits rose to $81,256 from $55,031. Earnings per share were $3.25 on the A stock and $1.22 on the common, compared with $2.20 and 70 cents respectively. Working capital increased to $745,832 from $709,953. Inventories were higher at $653,332 as against $480,952.

Central New York Section A.S.R.E.

A TALK on electric motors and their relation to the refrigeration industry was given by George Naft, manager of the sales service section of Century Motors, St. Louis, at a meeting of the Central New York Section of the American Society of Refrigeration Engineers, Utica, N. Y. The speaker was introduced by Lloyd Downing, New York State district manager of Century Motors. Regis Heitchue, an engineer at the Brunner Manufacturing Co., was chairman of the evening. Slides were shown of the clambake last Fall and Frank C. Hawk, Utica, vice-president of sales at Brunner's was accepted as a new member. About 45 members attended the meeting.

New Refrigerator Car Order

THE Pressed Steel Car Company has received an order from the St. Louis Refrigerator Car Company for 200 steel sheath 40-ton, 40-foot refrigerators cars, AAR Class RB, used for transporting beverages, ice, water or vinegar.

The St. Louis Refrigerator Car Company has ordered in addition 100 sets of car parts for the same type of steel sheath refrigerator cars for construction in the company's own shops.

National Political Conventions To Be Cooled By Two Air Conditioners

HOT words and torrid arguments at the Presidential nominating conventions in Chicago in July this year will be cooled by two huge Carrier air conditioning machines. The heavy-duty centrifugal equipment left Syracuse March 21 and arrived in Chicago March 26. Convention hall in Chicago, the 12,000-seat International Ampitheatre, will thus comfortably house the first completely air conditioned national political convention.

Cool as an Eskimo will be delegates to the two national political conventions this year when this carload of Carrier air conditioning equipment is installed in the convention hall, the International Amphitheater in Chicago. The two huge machines will supply the cooling effect of 2,000,000 pounds of ice daily—or 40,000 times the amount of the 50-pound cake the girls are holding. The shipment left Carrier's Syracuse plant March 21 for arrival in Chicago March 26 for installation for the first air-conditioned national convention.

The two machines, weighing 23 tons together, will have the same cooling effect as if 2,000,000 pounds of ice or five brim-full gondola freight railway cars of ice were hauled into the convention hall each day. For the first time in traditionally torrid Chicago July weather delegates will be assured of comfort even if outside temperatures crawl up to 95 degrees.

Centrifugal refrigeration, first developed by Carrier in 1922, is industry's favorite choice for handling ultra-large capacity cooling jobs. Instead of pistons pumping up and down in cylinders like an ordinary household refrigerator, the centrifugal machine has a large rotor balanced like a watch movement which purrs at better than 5,000 revolutions per minute to generate the refrigerating effect.

The machines will be installed in an addition to the auditorium which has already been constructed and will pump some 2,000 gallons of chilled water every minute to an array of cooling coils through which air for the building will be passed.

The system will make five complete changes of air an hour in the huge hall and will maintain relative humidity at a constant 50 percent. The installation is expected to cost about $300,000.

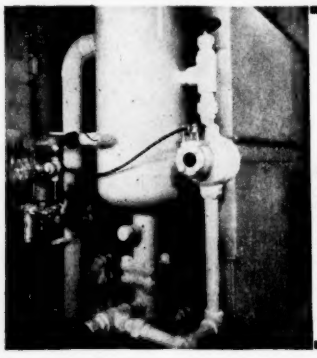
Belt Drive Air Pockets

WE HAVE often been told that a belt cannot properly pull its load when there are air pockets between it and the pulleys. We have also been told that one of the ways in which to exclude the air is to make the belt soft and pliable. Some users insist that the pliability way is the ONLY way to exclude air.

This writer agrees that a belt cannot pull full load when air pockets exist between the belt and pulley surfaces, but he does not agree that the *only* way to exclude the air is by making the belt soft and pliable. There are other ways. One way for instance, which the writer does not recommend, is to punch a great many holes in the belt so that the air can escape through the belt. This method has often been followed. Another poor way is to do the opposite and punch or drill holes through the pulley's rim so that the air can escape through the pulley. Another way, and possibly as good a way as any, surely better than punching holes in the belt or pulley, is to "groove" the pulley. Thus, some pulleys now on the market possess an air groove for this very purpose. The writer has in mind a pulley with such a groove which was not put there purposely to take care of the air but it is there just the same and it has been found that it solves the air problem very nicely and it is claimed to give increased tractive power.

The writer would add that in addition to using a grooved pulley, if one keeps his belts in nice soft and pliable condition, conditions are ideal for taking care of the air. Air pockets are then impossible because the air is "pinched out" as soon as the belt makes contact with the pulley.

V-Belts, of course, do not have air pocket problems. The above applies only to wide, flat belts.



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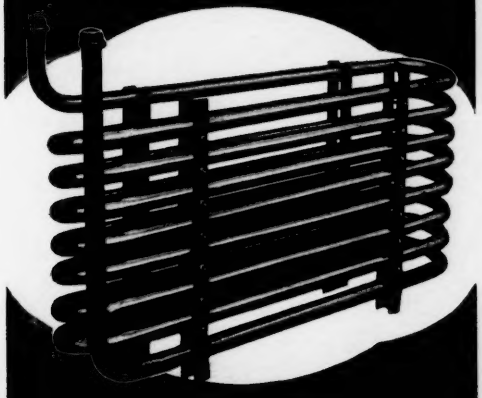

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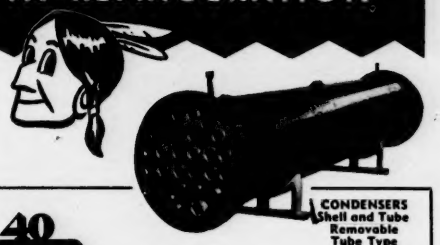
IN REFRIGERATION



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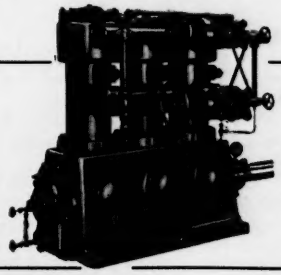
Get the benefits of Howe's 40 years of practical, field-proved refrigeration knowledge, and their ruggedly built, trouble-free equipment. You save money, space, labor, time—with Howe individually engineered installations, regardless of size. Write for free booklet, or without obligation consult Howe engineers on your refrigeration problems!

A few territories still open . . . write for details about the HOWE profit-plan for new distributors.



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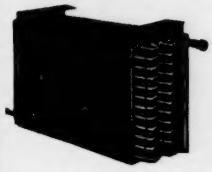
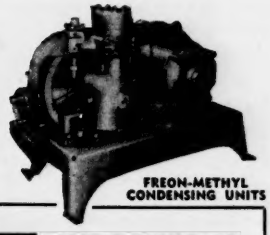


FIN COILS



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CONVENTION CALENDAR

THE REFRIGERATION RESEARCH FOUNDATION

May 2-4, 1952
Roosevelt Hotel, New Orleans, La.
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NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES

May 5-8, 1952
Roosevelt Hotel, New Orleans, La.
WM. DALTON, Executive Vice-Pres.

AMERICAN WAREHOUSEMEN'S ASSOCIATION

May 5-8, 1952
Roosevelt Hotel, New Orleans, La.
WM. DALTON, Executive Vice-Pres.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS

June 1-4, 1952
Biltmore Hotel, Atlanta, Ga.
M. C. TURPIN, Secretary

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

November 12-14, 1952
Adolphus Hotel Dallas, Tex.
A. R. CARLSON, President

Natural Ice

THE little town of Whitefish, Mont., on the shores of Whitefish Lake has been harvesting a big crop of ice which will amount to more than 3000 tons, stored in railroad and community ice houses. Edwin McKenzie, ice contractor for the Western Fruit Express Co., had a crew of 55 men cutting, floating, loading, hauling and storing ice.

The Forest Service took 23 tons for nearby ranger stations. Some was sold to the Great Northern Railway for use on the Spokane division and some was stored for local consumption. Most, however, went into the Western Express icehouse.

Swift Denies Closing Of Portland Plant

THE Portland, Ore., ice cream plant of Swift & Co., has been strike-bound now for many weeks, but rumors that it would close down permanently have been denied by the company. Operations have been suspended during the past three months because of labor disputes, but plans to permanently close this ice-cream making unit have not been announced.

Natural Ice Declines

ICE cutting in Chippewa Bay near South Hammond, N. Y., a business begun more than 100 years ago, has apparently died out. No ice was harvested during the past winter in the bay, although the work once required two months to complete, with ten to 15 men on the job.

With the development and increased use of manufactured ice and other means of refrigeration the ice harvesting business has been slowly diminishing in importance and volume. At one time, almost everyone in the summer colony at the bay used ice houses. George Cook at Chippewa Bay and Lee Schermerhorn at Schermerhorn's Landing operated central storage houses, and supplied the needs of summer residents.

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Eskimo BAGGER for Paper or Canvas Bags
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High enough to fill 100 lb. canvas bags . . . yet can fill your smallest paper bag by simply putting a small bench made the right height under the spout. EASILY INSTALLED . . . just place under the crusher or cuber . . . may be attached to the floor.

Build a slide to the crusher to hold several pieces of ice, then with both crusher and elevator controls mounted on the conveyor, several bags may be filled by one man without stopping. Fits either lengthwise or crosswise under the crusher to suit your individual needs. Powered with ¼ hp motor, comes ready to operate. You start saving money when you connect the current.

GET POULTRY ICE BUSINESS . . . The above unit may be used in large poultry plants for both putting ice in the coating tanks and packing crates. We will give you more information on request.

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NEW PLANTS and IMPROVEMENTS

This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

Arizona

Tucson, Ariz. — Lighthouse Seafoods, Inc. opened a shrimp processing plant here March 25. The principal work at the plant will be to process shrimp and other seafoods from Guaymas and Rocky Point, Sonora, Mexico. The plant will freeze 20,000 pounds of shrimp daily. Louis Bilbao, formerly of Nogales, is in charge.

Tucson, Ariz.—Construction of a warehouse that will hold 25 to 30 carloads of frozen foods has been started at Freemont and E. 17th Streets. The building is expected to be ready May 15, Jack B. Martin, head of the Arizona Ice and Cold Storage Co., said. Cost will be $125,000.

Yuma, Ariz.—The 10,000 ton ice storage building here which was reported in the December issue of ICE AND REFRIGERATION as being planned by the Southwestern Ice & Cold Storage Company has been completed. Total cost of the new building and ice handling equipment was $140,000.

Yuma, Ariz.—The Desert Ice Company has completed construction of a new ice storage building of 9,000 tons capacity. It was reported in the December issue of ICE AND REFRIGERATION this new construction was expected to cost $40,000.

California

Exeter, Calif. — Fremont Fruit Growers Association has completed an ice-operated precooler and storage building here with a capacity of 33 carloads.

Reedley, Calif.—Royal Valley Fruit Growers Association has completed and has in operation a combination ice-operated precooling and storage plant for precooling and storing approximately 27 carloads of tree fruits and grapes. Associated Refrigerating Engineers of Los Angeles were the contractors for the new plant which cost approximately $40,000.

Santa Rosa, Calif.—It is planned by some 150 Sonoma county poultry growers to remodel the present National Ice Company building here and equip it to eviscerate and pack poultry for the area.

Sultana, Calif.—Construction of a cold storage plant by Mike Hure at a cost of $25,000 is under way.

Colorado

Durango, Colo.—The Durango Ice & Produce Company has a new 18 ton ice plant in operation. The old plant was destroyed by fire in 1949 which necessitated hauling ice 225 miles to supply the area. Ed Carey is manager of the new plant.

Florida

Lakeland, Fla.—The formal opening of the Velda Ice Cream Co. plant at 1223 East Magnolia Street was held recently. The Lakeland plant, a branch of the main manufacturing operation in Euleta, serves as a distributorship for Polk, Pasco, Hardee and Highlands counties.

Illinois

Momence, Ill.—The Doyle Packing Company is remodeling the plant which will take two to three months to complete.

Louisiana

New Iberia, La.—A new $720,000 freezing and storage plant, having capacity to freeze and store 500,000 pounds of food, is to be constructed on a ten acre tract on the property of the Port of New Iberia, on the Commercial Canal, it was announced recently. Negotiations were between F. J. Le Blanc of Delcambre, La., owner of the Tasty Tempt Food Products Company and the Port of New Iberia. A 95-year lease for the property was signed.

Michigan

Houghton, Mich.—Thomas Risell & Company has installed an artificial ice manufacturing plant which is now producing block and cube ice. The plant can produce 2000 pounds of ice per day. In addition to the daily production, the company has a stockpile of 570,000 pounds of natural ice.

Oregon

Ontario, Ore.—The Oregon Frozen Food Company is making plans to double the production of the plant this year.

Ohio

Cincinnati, Ohio—Geo. H. Thomas, Inc., associated with the Plenty Fresh Co. which owns, controls and packages "Donald Duck" and "19 Brand" frozen fruits and vegetables recently dedicated its new 2,000,000 pound zero cold storage room at 2155 Washington Avenue, Norwood.

Texas

Elgin, Tex.—Elgin's new Seven-Eleven store had its formal opening recently. The store chain is a part of the Southland Corporation which has operated an ice company here for many years. The store features a drive-in grocery and ice service.

Virginia

Norfolk, Va.—The brewery operated by the Glasgow Brewing Company in the Boush Ice and Cold Storage Plant at 219 Boush Street has gone out of business and the space, 225,000 square feet, is being converted for cold storage purposes and will boost the plant's capacity in this respect to close to 1,500,000 square feet. Connell said the additional cold storage space will be used for frozen meats, fruits and vegetables.

Fires and Accidents

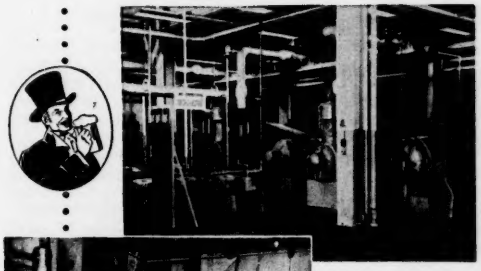
Petit de Grat, N. S., Canada—A fire that destroyed a large part of a new fish plant here owned by Booth Fisheries Co. Ltd., has unofficially been estimated to have cause damage of $1,000,000. Value of the plant, under construction for a year, was placed at $1,500,000. It was in partial operation. Only the freezer and power house were left standing, although they had suffered damage estimated at 50 percent, it was reported.

Vincennes, Ind.—Fire destroyed a 50-year-old brick building of the Ebner Ice and Cold Storage Company used to store ice and apples. Firemen said the blaze apparently started accidentally by flames from an acetylene torch used by workmen in the 50-foot high structure. An immediate estimate of the loss was not available.

Lawrence, Mich.—Fire started by an exploding oil stove caused approximately $25,000 worth of damage to the Lawrence Frozen food plant. Donald Carpp, owner of the processing and cold storage plant, said the frame structure itself suffered almost $15,000 worth of damage. The other $10,000 was sustained by machinery and packing equipment. The loss was covered by insurance.

Klamath Falls, Ore.—Fire swept through the Klamath Packing Company plant, destroying the interior at a loss estimated at $225,000 by owner Frank Lowell. The flames apparently started in the boiler room. Mr. Lowell said he did not have enough insurance to rebuild.

Pittsburgh, Pa.—Fire swept through a storage building of the City Ice and Fuel Co., in the 5500 block of Claybourne St., East End. recently. The loss was estimated at $15,000, although the City Products Corp., of which City Ice & Fuel is a subsidiary, made no estimate but said expensive equipment for crushing and sizing ice was damaged.



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Naturally, when Frankenmuth began their extensive remodeling and re-building program, Vilter refrigeration was slated for an important part. Vilter compressors, condensers, air units, super capacity water coolers, liquid receivers, and other equipment contribute to the modern efficiency of this model brewery.

It's no surprise to see Vilter selected time and time again as America's alert breweries expand and modernize. Over half of the breweries in the country know Vilter quality and Vilter economy from their own experience. They know that Vilter equipment lasts longer, runs at lower cost, requires less maintenance, so it's only natural that many a brewery has re-ordered Vilter for over 50 years.

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DEATHS

August P. Anderson

THE passing of another pioneer of the refrigeration industry was noted in the recent death of August P. Anderson. He was 77 and had been active in refrigeration work until the last few years. He retired from the design department at Penn Controls, Inc. in Goshen, Ind. in 1947.

Starting at the turn of the century in ice manufacturing at the Consumers Company of Chicago, he rose to chief operating engineer. He later became chief engineer of the Howe Ice Co. of Nashville, Tenn. and then chief engineer of the Hygienic Co., an ice manufacturer of Chicago.

Mr. Anderson did designing and development work in the early days of the Peerless Ice Machine Co. of Chicago, the Coldmaker of Toledo and the Excelsior Co. of Chicago. He was granted many patents on compressors and regulating and controlling devices for many of these early refrigerating systems.

In 1918 he was granted a patent on a self-contained refrigerator and in 1922 was granted the original patent on a two-temperature refrigerator. About 1932 he began development work on room coolers. After a short period at Automatic Products Co. of Milwaukee he joined Penn Controls, Inc. in Goshen, Ind. in 1941. At these plants he designed regulating valves.

His belief in refrigeration was a life long intensity and even after his retirement he designed and patented new type compressors and refrigerating equipment.

CHARLES TAYLOR, long associated with the ice and cold storage business in Seattle, Wash., although recently retired, died in March in a Seattle hospital after a brief illness. He had been with the Diamond Ice & Storage Co. of Seattle for twelve years before retirement. Born in Beachburg, Ontario, he had lived in Regina, Sask. before coming to Seattle 26 years ago. His wife, Helena, died two years ago, but he leaves a son, Gordon M. Taylor, two daughters, and six grandchildren, all of Seattle.

WADE A. BLANDIN, 59, retired operator of the Crystal Ice Company store, Dallas, Tex., died April 10 after an illness of three months. Mr. Blandin formerly was owner and operator of a dairy in Dallas and for sixteen years operated the Crystal Ice Company store at 2515 Second Avenue. He retired two years ago.

HARVEY R. KIEFABER, retired vice president of the Philadelphia Warehouse and Cold Storage Company, died March 19 at his home in Philadelphia.

Clinton H. Haskell

THE death of Clinton H. Haskell, president of Beatrice Foods Co. for the past 24 years, and a pioneer of the dairy industry, occurred at St. Francis Hospital in Evanston March 21, 1952 at the age of 63 following a long illness. He had been associated with the company for 46 years.

Clinton H. Haskell

At the age of 17, young Clinton Haskell joined the Topeka branch of the dairy and produce business founded by his father, John F. Haskell and an uncle, George E. Haskell. Through successive stages he finally moved to Chicago in 1923 to become assistant general manager. In 1927 he was promoted to general manager and a year later was elected president. Under his leadership the company became the third largest in the dairy industry.

An active supporter of dairy industry organizations, he was a past-president and long-time director of the American Butter Institute and a director of the National Dairy Council. He was a director of the U. S. Chamber of Commerce between 1936 and 1938 and was a member of the agricultural committee of the National Association of Manufacturers. During the last war he served on the Milk Conservation Committee of the War Food Administration. He was a member of the Chicago Board of Trade, the Chicago Mercantile and New York Merchantile Exchange.

Mr. Haskell leaves his widow, Ethel, two daughters, Mrs. Lorraine East of 3210 Hartzell Avenue, Evanston, and Mrs. Virginia Ball of 12 Williamsburg Court, Skokie, Illinois. He is also survived by two brothers, Everett E. Haskell, a vice president of Beatrice Foods Co., and Willard V. Haskell, manager of the company's Topeka, Kansas plant.

LOUIS J. EICHENLAUB, former manager of the Union Ice Co., Erie, Pa., died in Hamot Hospital March 14 after an illness of one and one-half years. He was 56. Born in Erie, he is survived by his widow, Mrs. Gertrude Rastatter Eichenlaub, two daughters, and three sons.

James Stewart Wiant

THE death of Dr. James Stewart Wiant, plant pathologist of the U. S. Department of Agriculture and widely known, especially in the commercial end of the fruit and vegetable business, occurred March 15 at his home in New Jersey. He had carried on research at the Market Pathology Laboratory of the Bureau of Plant Industry, Soils, and Agricultural Engineering at New York City for 20 years and had been its head since 1947.

Results of Dr. Wiant's work have appeared in many official technical bulletins and in production, packaging, packing, market, refrigeration and science journals and in newspapers throughout the country. The laboratory and staff expanded greatly while he carried on his work there. His Department of Agriculture publications include five of the series of fruit and vegetable market disease bulletins that are widely used by growers and the trade. He was especially well known for meticulous investigations that have resulted in much better control of market and storage diseases of cantaloupes and honeydew melons and internal black spot of potatoes.

Edward G. Mild

THE death of Edward G. Mild, president of the Mount Vernon Ice Delivery Company, Mount Vernon, Ohio, occurred February 23 in the Mercy Hospital at Mount Vernon following a lengthy illness. Mr. Mild was chief engineer for the Atlantic Ice & Fuel Company, Montgomery, Ala., for eleven years, returning to Mount Vernon twenty-seven years ago to become associated with his father in the ice business. He was a member of the First Presbyterian Church, the Mount Vernon Lodge of Elks, the Moose and Eagles. He was a 32nd Degree Mason and belonged to the Masonic bodies in Montgomery, Alabama. He was a member of the Ohio Association of Ice Industries and a supporter in all organized efforts within the ice industry. He is survived by his widow, Mrs. Alice Mild.

CLEMENT M. BONNELL of Clinton, N. Y. who operated an ice business in Clinton, Annandale and Glen Gardner died February 1. He was 77 years old. Mr. Bonnell had lived his entire life in Clinton.

MARK W. HESS, 61, Bartlesville, Okla., died at the Crystal Ice Company plant where he was chief engineer. Death was caused by a heart attack. He had been an employee of the ice company for 28 years.

CHARLES A. DORAN, formerly plant manager for the Consumers Ice Company for 48 years until his retirement in 1938, died at the Hayes Hotel, Chicago, Ill., March 16. He was 95.

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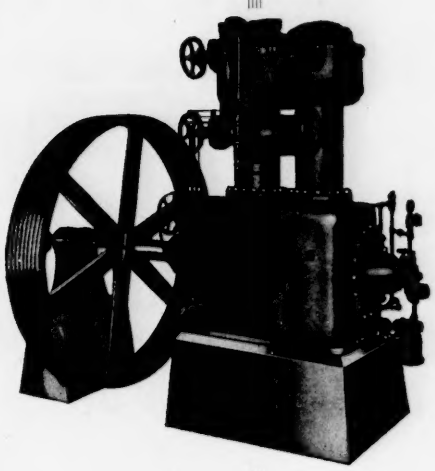

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Changes in Poultry Grading and Inspection

THE U. S. Department of Agriculture has proposed changes in the poultry grading and inspection program in addition to those proposed on January 3, 1952. The further changes are designed to effect greater coordination between classes, standards, grades, and processing procedures set forth in the grading program and those to be included in Federal specifications under which poultry will be procured for the Armed Forces and other governmental agencies. The proposals have been made as a result of consultation with U. S. Army Procurement and industry representatives.

The major changes proposed would:

Major Changes Proposed

(1) Add a new class of turkeys to be known as "yearling hens" and change the present classification "mature or old hens" to "old hen turkeys." The yearling hen class will include fully-matured birds which are usually less than 15 months old and which have been used during one season to produce hatching eggs.

(2) Provide for the examination of uninspected, ready-to-cook poultry in cases where the product has become damaged in transit or storage and in instances where quality or class determinations are requested. Such poultry, however, would not be graded and inspected for quality or wholesomeness, nor would it be identified by tag or stamp as officially graded or inspected poultry, but would be accompanied by a certificate showing the actual condition of the poultry when examined.

(3) Require that printed labels be used to identify dressed poultry which is processed under USDA's sanitary standards. Under the present program, such identification may be applied by the use of a rubber stamp.

The proposed amendments to the poultry grading and inspection program would also extend an earlier proposed date to June 30, 1953, after which consumer grade labeling of individual carcasses of non-eviscerated, dressed poultry (New York dressed) will be prohibited. Under present regulations, dressed poultry may be graded for quality and individual carcasses or bulk containers may bear the quality label. This proposal would prohibit the labeling of individual carcasses of dressed poultry, but would not prevent the labeling of bulk or shipping containers of such poultry provided it was processed in official plants operated under USDA's sanitary requirements.

Other Proposals Accepted

Other proposals announced January 3 to which industry generally has agreed are: (1) Elimination of the authority of the administrator of the Production and Marketing Administration to permit dressed poultry produced in a non-official plant to be brought into an official plant for canning; (2) provision to permit dressed poultry processed in registered Canadian poultry dressing stations to be brought into official U. S. plants for grading or inspection; (3) provision to permit domesticated game birds that were dressed in other than official plants to be further processed and graded and inspected in an official plant; (4) provision for the individual grade labeling of C Quality ready-to-cook poultry in addition to A and B Quality; (5) provision for the prompt cooling of poultry following processing; and (6) minor changes in the regulations in the interest of clarification.

Poultry plant operators and others interested will have 15 days after publication of the new proposals in the Federal Register to submit arguments and views concerning these or further changes.

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- CONTRACTORS
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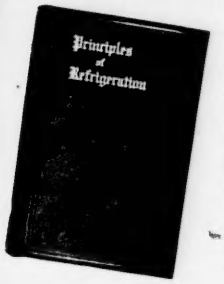

PRINCIPLES OF REFRIGERATION, 3rd Edition (1947) revised by Wm. H. Motz, provides information and data for the practicing refrigeration engineer. Of special interest to erecting and operating refrigerating engineers, refrigeration machinery sales engineers, persons employed in building refrigerating machinery and those employed in ice making, cold storage plants or other establishments equipped with refrigerating machinery. Contains information that the refrigerating engineer should know in order that he may have complete and up-to-date knowledge.

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USED FOR YEARS in ice plants all over the world, TEMPLETS are the famous green tablets that dissolve quickly and leave no odor, taste or color. The TEMPLETS treatment costs only about 1c a ton—try it today at our expense!

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What's New in Equipment

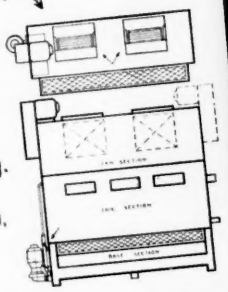
Machinery - Appliances - Processes

York Announces New Automatic Ice Maker

AN AUTOMATIC ice maker, the smallest commercial type ever developed, has been placed in production by York Corporation. This machine, known as the York-FlakIce Automatic Ice Maker, Model DER-2, is designed to produce up to 300 pounds of ice per day without the use of an auxiliary crusher. It was designed primarily to meet the demands for equipment to produce ice in small pieces at the point of use by the smaller commercial establishments including bars, hospitals, soda fountains, hotels, restaurants, taverns, groceries, chain stores, seafood houses, poultry stores and other handlers of foodstuffs, including the military, where the daily ice requirements usually do not exceed 250 to 300 pounds. The ice produced is in a slightly curved form.

Pages from an ENGINEER'S NOTEBOOK

MEMO: Purchasing Dept.
SUBJECT: Acme Evaporative Condensers



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The sturdy construction and advanced design of Acme products is known, noted and appreciated throughout the refrigeration industry. So get the aid and advice of experts if you are in need of evaporative condensers, ammonia condensers, or industrial unit coolers. Write a letter today for any information that you might desire.

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ACME INDUSTRIES, INC., Jackson, Mich.
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Continuously serving the air conditioning and refrigeration industry since 1919

Heat-Resistant Roofing

A NEW asbestos aluminum coating for roofs which is reputed to lower under-roof temperatures from 10 to 20 degrees has been developed by Paramount Industrial Products Co., Cleveland. Made of asphalt, asbestos and waterproofing oils doubly pigmented with aluminum, the coating reflects the sun's rays. Called Aluma-Seal, the product is said to withstand all extremes of heat and cold without cracking or wrinkling and is highly resistant to industrial vapors, gases and fumes. It can be brushed or sprayed.

MANUFACTURERS' NEWS

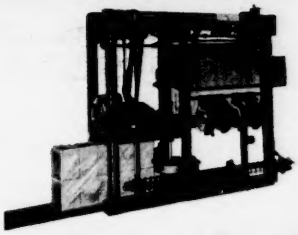
New District Manager for Baker Refrigeration Corp.

THE appointment of Frank Quinn as district manager in the Washington-Philadelphia District for Baker Refrigeration Corp. has been announced by Mark E. Mooney, vice-president in charge of sales. He takes the place of Walt Woodroof who left to rejoin American Radiator Sanitary Corp.

Frank Quinn

For the past two years, Mr. Quinn has been with The Lessner Company, Baker distributors in Philadelphia where he had a successful sales engineering record. He knows the Baker line thoroughly and has engineering education and the practical background of sales and business experience in problems facing refrigeration and air conditioning contractors. His office will be at 1728 I Street, Washington, D. C.

★ *Perfection* A MODEL FOR EVERY REQUIREMENT ★



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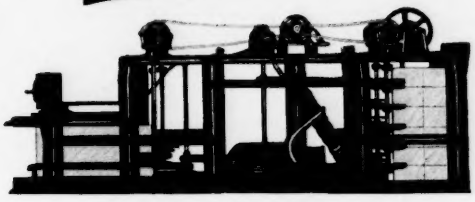
Illustrated at left is the 300 pound MILLER model which scores over 50 tons per hour . . . also available is a 400 pound model scoring 65 tons per hour. Only one operation is necessary for complete scoring. The MILLER is the lowest priced heavy duty Scoring Machine on the market today.



PERFECTION SPECIAL

The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.

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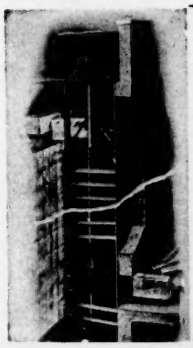

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Fast - Sturdy - Dependable -

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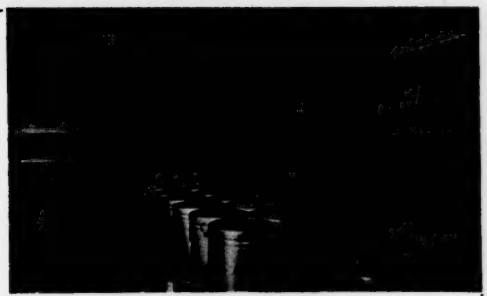


DIMCO Fin Coils solve low headroom problem
View of Mezzanine Lard Storage Room
Peters Sausage Company, Detroit, Mich.

Vending Machines

THE following installations of vending equipment have been reported:

Ottawa, Canada—Ottawa Ice Co. Ltd., reports recent installation of a 20 ft S & S complete ice vending station.

Denver, Colo.—Self-Serv Ice Co. has installed four new S & S ice vending stations, each unit equipped to dispense both block and packaged ice.

East St. Louis, Ill.—Williams Ice Co. has expanded its ice service by installation of S & S ice vending stations.

Augusta, Kans.—Southwest Service Co. has installed an S & S ice vending station.

Delhi, La.—Delhi Ice & Fuel Co. has installed S & S equipment for use during the coming season.

Bartlesville, Okla.—Crystal Ice & Frozen Food Co. is operating several new S & S 24-hour units.

Middletown, Pa.—Middletown Ice & Coal Co. report recent installation of S & S equipment.

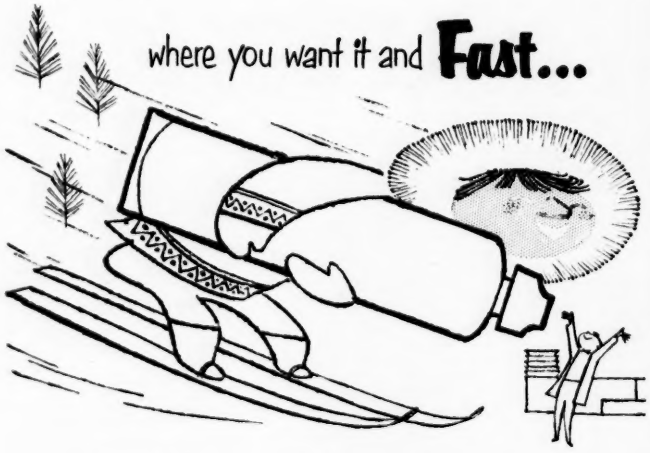
Snow Hill, Md.—Davis Ice & Fuel Co. is operating a complete S & S vending station.

Everett, Wash.—American Investment Co. is now operating two new S & S ice vending stations.

Remember the name ARMOUR for

Ammonia when you want it

where you want it and **Fast...**



Armour's 65 conveniently located stock points assure you prompt delivery of anhydrous ammonia. No matter where you're located, there's an Armour Branch in the vicinity. Armour's Anhydrous Ammonia is pure and dry – free of moisture, non-condensable gases and oil. To protect you, every cylinder is tested, checked and sealed before shipping. Available in 50-, 100-, or 150-pound cylinders.

You can depend on Armour's Ammonia and Service

ARMOUR *Ammonia Division*

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Trant Company New Acme Representative

THE recent appointment of Laurence Trant and Company as Acme representatives was announced by K. A. Weatherwax, President of Acme Industries, Inc. The Trant company which is located in Norfolk, Va., will feature the complete line of Acme air conditioning and refrigeration equipment. Their territory includes the State of Virginia with the exception of Fairfax county and the City of Arlington.

The firm headed by Mr. Laurence Trant is very well known in Virginia having specialized in heating, ventilating and air conditioning equipment for over fourteen years. Howard E. Marquart and J. A. Hagan are sales engineers and both are extremely well versed in heating, ventilating and air conditioning, each having over five years experience in these fields.

Acme Industries Inc., located in Jackson, Mich. manufactures a line of air conditioning and refrigeration equipment.

Roots-Connersville Change

EFFECTIVE March 31, 1952, Roots-Connersville Blower Corporation was absorbed into the corporate structure, of its parent, Dresser Industries, Inc., and thereafter will operate under the name, "Roots-Connersville Blower," a Division of Dresser Industries, Inc., it was announced recently by R. H. Owens, President.

Roots-Connersville will continue to operate as a separate, completely integrated organization at the same address, with identical plant and management as heretofore, Robert H. Owens having been appointed as president of this Division, and Ralph Newquist, executive vice-president. No changes in organization or plant facilities as a result of this action are contemplated.

The manufacturing plant of Roots-Connersville Blower Corp. is located at Connersville, Ind.

Acme Industries Opens New Chicago Office

CONTINUING with the company's expansion program, K. A. Weatherwax, president of Acme Industries, Inc., Jackson, Mich., has announced the opening of a new and larger office in Chicago. The new address will be at 230 East Ohio Street, Chicago 11, Illinois. The former office at the machinery sales building on West Washington Street, Chicago, has been discontinued.

The new office is much larger, more convenient and will have a larger staff to serve the growing number of Acme accounts in the Chicago area. It will have as a nucleus, R. T. Hansen, regional manager, William E. Lloyd, George V. Mercer and Ray

ICE SUPPLIES

- PAPER BAGS
- CANVAS BAGS
- ICE PICKS
- ICE TONGS
- TANK SUPPLIES

EQUIPMENT

- SHAVERS
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**Stainless Steel Crusher Housing (Optional)*

"Complete line of Tools and Supplies for the Ice Industry"

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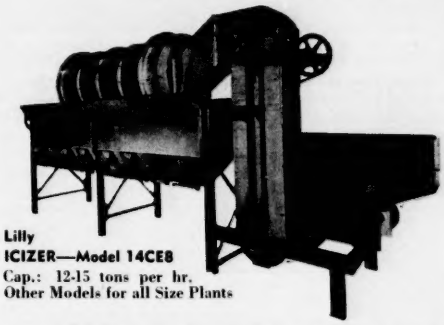
NEW - 1952 CATALOG & PRICE LIST

Prompt Shipment on all Your Needs

THE LILLY COMPANY
466 Union Avenue, Memphis 1, Tenn.

MORE PROFIT IN ICE
–When Sized by a Lilly ICIZER



Lilly ICIZER—Model 14CE8
Cap.: 12-15 tons per hr.
Other Models for all Size Plants

Ice—*properly sized*—brings premium prices—more dollar profit. It brings additional sales and profits the year 'round. The new engineering features in Lilly ICIZERS and CRUSHERS—*Stainless Steel Breaker Housing (Optional), reduced drum speed, etc.*,—give you even more economical and better controlled production.

Write *today* for complete information and prices on—

Lilly ICIZERS and CRUSHERS

Ask for Catalog No. 302

BLOWERS WITH V-P-L

Send for Bulletin R-C 1247 without obligation

For year-round satisfaction, blowers must deliver positive Volume at required Pressure and Low power cost. Performance of R-C Rotary Positive Blowers has been proved for many years in large and small plants.

ROOTS-CONNERSVILLE BLOWER
A Division of Dresser Industries, Inc.
525 Columbia Avenue, Connersville, Indiana

LITTLE GIANT
ICE BREAKERS

- *SAVE TIME*
- *SAVE LABOR*
- *SAVE ICE*

11 MODELS TO CHOOSE FROM
Write for Descriptive Circular

MODEL W-90-M
ADJUSTABLE GRATE—For TRUCK MOUNTING

MICRON, INC., Dept. I
BETTENDORF, IOWA

DANBUX
INSULATED COVERS

NO SHIFTING, NO WADDING
20 SIZES

PROTECTION
QUALITY
SERVICE
FOR THE ICE INDUSTRY

METAL BOTTOM ICE BAGS

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C. R. DANIELS, INC.
Daniels, Md 75 West St., New York 6, N. Y. 549 W. Randolph St., Chicago 6, Ill. 121 E. Third St., Charlotte 2, N. C.

Nast as sales engineers. All are very well known in the Chicago area. Bill Lloyd has been associated with Acme for fifteen years. George Mercer enters the Chicago office following a transfer from the home sales office in Jackson. Ray Nast has joined the firm and has wide and extensive experience in the field.

R. T. Hansen, regional manager, announced that the objective of the Chicago office was to increase Acme's services and facilities to benefit the growing number of accounts in the Chicago area. He will continue to supervise sales in the Central region in addition to his services in Chicago.

Sporlan Valve Announces Changes in Sales Staff

SEVERAL territory reassignments and the appointment of Robert L. Vandiver as field sales engineer for the newly established territory with headquarters in Syracuse, N. Y., is announced by the Sporlan Valve Co., St. Louis, Mo.

Mr. Vandiver's territory comprises western New York and western Pennsylvania, sections of which were formerly in Cleveland, Ohio and New York City territories. Mr. Vandiver attended Ohio State University and was formerly associated with Wright Air Development Center Equipment Laboratory of the U.S.A.F. and Chrysler Corporation, Airtemp Division. During World War II he served with the Army Engineers.

Robert L. Vandiver

Jack E. Dannels, until recently maintained headquarters in Cleveland, Ohio. He has established his new office and center of operations in Cincinnati, Ohio, located at 8705 Monsanto Drive.

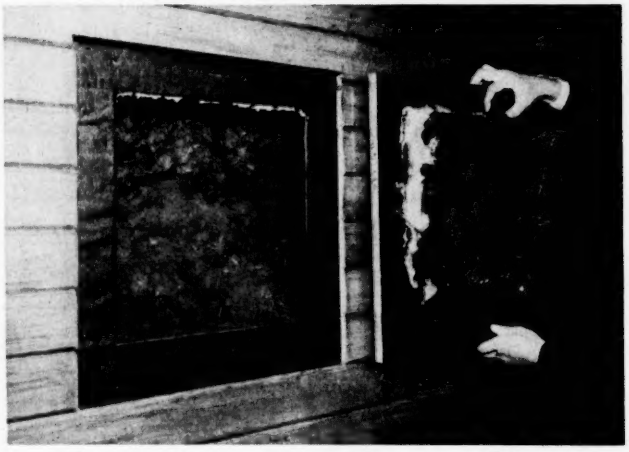
Jack E. Dannels

Will Reichenbach, who formerly covered portions of upper New York State territory will concentrate his activities in Metropolitan New York,

Will Reichenbach

the Hudson River Valley Area and the State of New Jersey. He will operate from Sporlan's Eastern Office, 22 West First Street, Mt. Vernon, N. Y.

In-place tests prove PROPER VAPOR SEAL NEEDED



. . . for maximum insulating efficiency

ABOVE: *Vapor seal omitted from outside wall of test freezer section, insulated with 10 inches of Palco Wool. Two layers of vapor proof paper on cold side created a vapor dam, forming a buildup of ice after seven years at 0°. In a simultaneous test with two layers of vapor proof paper properly applied to the warm wall and omitted from cold side, only slight frost formation was caused by the partial vapor dam effect of varnished wood.*

In this and subsequent scientific *in-place field tests*, Palco Wool Insulation retained its original efficiency throughout the ice-free insulated area. This is due to low moisture pattern and ability to allow moisture to migrate freely toward low temperature side instead of accumulating within the insulation to destroy its effectiveness. For this valuable test data, request: Technical File No. IR-2.

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PALCO INSULATION WOOL

THE BUYERS DIRECTORY

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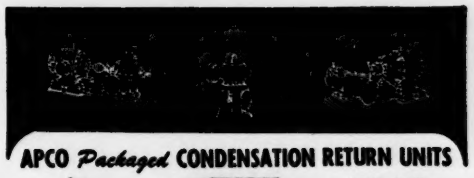

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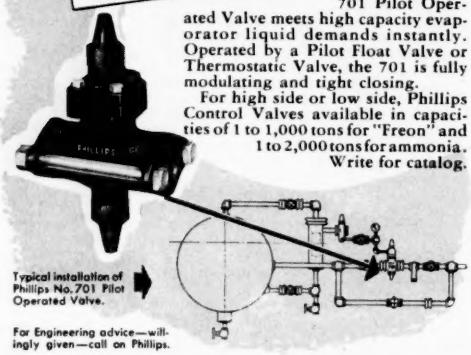

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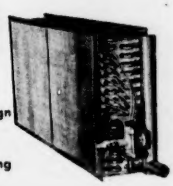

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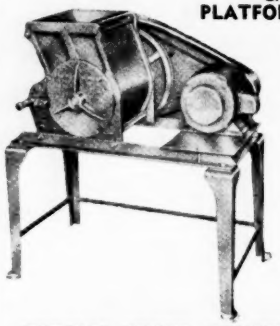

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Roots-Connersville Blower Corp., Connersville, Ind.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

DIRECTORY

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Layne & Bowler, Inc., Memphis, Tenn.

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Roots-Connersville Blower Corp., Connersville, Ind.

PURGERS
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Frick Company, Waynesboro, Pa.
Rex Engineering & Sales Co., Oklahoma City, Okla.

RAW WATER FREEZING SYSTEMS
Frick Co., Waynesboro, Pa.
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Vogt Machine Co., Henry, Louisville, Ky.

REBOILERS
Frick Company, Waynesboro, Pa.
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REFRIGERATED ICE STATIONS
S & S Vending Machine Co., San Jose, Calif.

REFRIGERATING AND ICE MAKING MACHINERY
(See Ice Making and Refrigerating Machinery)

RESPIRATORS
Acme Protection Equipment Co., Chicago, Ill.

RUST PREVENTATIVES
Bower Chemical Mfg. Co., Henry Philadelphia, Pa.
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Lilly Co., The, Memphis, Tenn.
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Vogt Machine Co., Henry, Louisville, Ky.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SIZED ICE EQUIPMENT
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Vivian Mfg. Co., St. Louis, Mo.

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Philadelphia Pipe Bending Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

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IN single or multiple units, Layne well and pump installations produce tremendous quantities of water at extra low cost. High efficiency designing, precision building and advanced methods of installation make Layne wells and pumps a highly practical and fully justified investment. Layne does the job complete; drills the wells, furnishes all casing, shafting, pumps, motors and sand screen. After complete testing, the system is delivered to you in perfect operating order.

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General Offices, Memphis 8, Tenn.

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TOP CONSTRUCTION!

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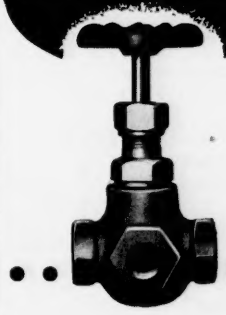
For use where Refrigeration Codes require dual relief valve installations. Stainless steel stem. Indicator plate on hand wheel shows position of valve shut off. Completely rustproofed.



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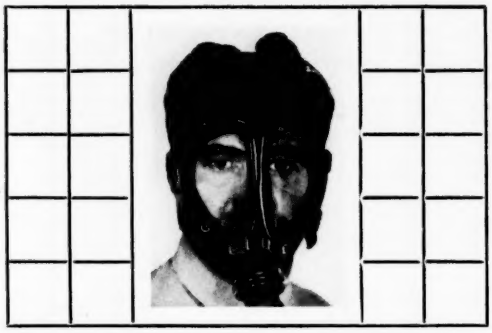

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You never have that "jammed-in" feeling, wearing the Acme Full-Vision Gas Mask. Its patented, larger lenses are like picture windows, giving you full natural vision for that safe, unconfined feeling. When you walk, you can actually see your toes without bobbing your head. This factor alone makes Acme outstanding among gas masks . . . well worth looking into.

Write for the complete story on Acme Gas Masks for The Refrigeration Industry

Acme Protection Equipment Co.
3037 West Lake Street, Chicago 12, Illinois

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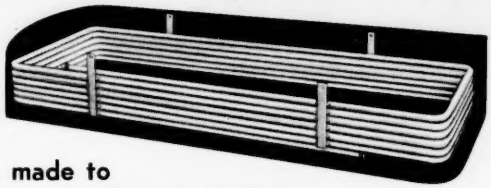

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YOUR SPECIFICATIONS

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Highest quality materials, modern coil bending power equipment and a staff of skilled men thoroughly experienced in coil making and welding, assure you of the finest product you can buy. All coils are tested for leakage under water with 300 pounds of air pressure.

On your next job—single bend, coil or complete system—check first with Chicago Nipple. *Send drawing or blueprint for quotation.*

CHICAGO NIPPLE MFG. CO.
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Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1951 catalog.

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LA PORTE, INDIANA

USED ICE MACHINES & EQUIPMENT

- COMPRESSORS—3x3 to 12x12
- COMPRESSORS—with or without MOTORS
- COMPRESSORS—Diesel or Steam driven
- COMPLETE ICE PLANTS—15 to 50 Tons
- CONDENSERS—TRAVELING CRANES—PIPE — ICE CANS — NEW and USED

See Our Monthly Specials in the Classified Columns

Write or call for complete list of new and reconditioned ice making equipment.

ROBERT P. KEHOE MACHINERY CO., INC.
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ENGINEERS
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to make the kind of Ice Picks that will give YOUR customers satisfaction and build up GOOD WILL FOR YOU.

PRICE UPON REQUEST

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All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: $4.00 for 50 words or less; 70c for each additional 10 words or fraction thereof; $1 per line for bold face headings; $10.50 per inch for line listings.

ICE PLANTS—for sale

FOR SALE—Zenith 3 ton portable ice plant, with 10 ton motor and extra compressor for storage room. Can operate at present location or move. Write Zenith Ice Co., Box 414, Garden City, Kansas.

FOR SALE—Citizens Pure Ice Co. plant at 1504 W. Main St., Red Wing, Minn. Complete 20 ton plant. Any reasonable offer will be considered. Will sell either the equipment only or the entire plant. Open for inspection. The Supreme Lodge, Sons of Norway, 2947 Girard Ave. So., Minneapolis 8, Minn.

FOR SALE—THIS PLANT PAYS OFF

15 ton ice manufacturing plant with 350 lockers. Best lake resort and retirement area in United States. No dull seasons; year round business. Will pay out in three years or less. Nearest plant is 50 miles. Ahrens Ice Co., Mountain Home, Arkansas.

USED EQUIPMENT-wanted & for sale

FOR SALE—5x5 Creamery Package self-contained unit, 5x5 Baker self-contained unit, two Frick 6x6 with 15 h.p. motors and V-belts, York 9x9 direct connected to 75 h.p. Ideal synchronous motor. 40 ton open type ammonia condenser, York trunk type freezing coil complete. Write us your requirements. Parke Pettegrew & Son Co., 370 West Broad St., Columbus 8, Ohio.

FOR SALE

2—Bruce 165 h.p. West. 125 KVA units, ea.	$3350.00
1—Frick 80 tube 16 ft. vert. condenser	395.00
1—Vilter 155 tube 12 ft. vert. cond.	550.00
1—Vilter 8½x8½ w/75 h.p. motor	2250.00
1—Lipman 7½x7½ w/50 h.p. motor	1350.00

Our current catalog sheets on request.

A A A STEEL, MACHINERY & SUPPLY CO.

Box 6246 Dallas, Texas

FOR SALE—Ice plant equipment; eight can lift, Knickerbocker grids, 7 inch, 7½ inch and 9 inch compressors, synchronous motors, can dump new, dip tank new, Perfection scoring machine, welded ice cans new, 4 shell and tube condensers, two air blowers, 3 water pumps, Shepard crane, 2 ice tanks, 1 brine cooler, single pass, 46"x13', 180—2", one 36"x13', 175-2". Location Beacon, N. Y. Address G. M. Currie, 35 High St., Poughkeepsie, N. Y.

FOR SALE—3x3 self-contained York. 4x4, 5x5, 6x6, 8x8 and 9x9 Yorks, splash lubrication. 9x9 and 8x8 Worthington compressors 360 r.p.m. with synchronous motors, direct connected. Receivers, all sizes. 3 ton Niagara Blower unit. 15 ton enclosed brine cooler, float control. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

USED EQUIPMENT—continued

FOR SALE—1 Fairbanks-Morse Diesel engine 240 h.p. 4 p.st.n, priced at $3,000.00. 1 Fairbanks-Morse Diesel engine 60 h.p. priced at $800.00. Write or call North Pole Ice Co., 614 Gaston Ave., Fairmont, West Va. Phone 2448.

FOR SALE—York 8x8 ammonia compressor 25 h.p. motor; Vilter 10 1½x20 horizontal compressor 75 h.p. motor; 2300 volt compensator, 220 compensator and oil switch; 8" 5 h.p. Fairbanks turbine; new 60 ton condensers and receivers; can filler, and 400 lbs.; 2 Roots blowers with motors; 3 brine pumps 3 h.p. motors; 10 cases 2½" insulation. J. P. Heinlen, Garrett, Ind.

FOR SALE

1—Chicago Pneumatic Model RH-75-D Diesel engine, 3 cyl., 14x21", 285 h.p. at 300 r.p.m. (Originally installed with ice machine.)
1—York 15 ton ammonia compressor.
3—Shepard Niles 6-ton ice cranes, 28' span, four hook, AC current.
9—York 1 ton portable ice plants, Freon, gasoline dr. can convert to electric.

Inspection on our premises.

CONSTRUCTION & POWER MACHINERY, INC.
270 - 23rd St. Brooklyn, N. Y.

FOR SALE—Kold Hold freezer plate units, 18 sets 6 plates per set 2'x12.5' per plate, 18 sets 3 plates per set 2'x12.5' per plate, 8100 sq. ft. evaporator surface in all. Suitable for large freezer or cooler room. Tropical Ice & Cold Storage Company, 3900 Tchoupitoulas St., New Orleans 2, La. Phone UPtown 7404.

FOR SALE—York Corp. U.S.A. ammonia compressors; one 6½x6½, one 7½x7½, one 8x8. Also two 7x5 Pennsylvania Pump Co. air compressors. Two 12x10 Union Steam Pump Co. air compressors. All machines with or without motors. Stock of good used ice cans, 300 & 400 lb. sizes. David Gordon, 1502 Indiana Ave., Chicago 5, Ill.

FOR SALE

1—50 ton Frick ice plant—27 can pull—evaporative condensers—may be inspected in operation.
1—150 ton York ice plant—13 can pull—equal to new.
1—12½x14½ York ammonia compressor, 225 r.p.m.
2—10x10 York ammonia compressors, 300 r.p.m. w/220 volt synchronous motors.
1—9x9 Frick compressor with V-belt drive, 50 h.p. motor.
1—7½x7½ York ammonia compressor, high speed.
1—16"x18' horizontal enclosed type condenser.
1—100 h.p. G.E. synchronous motor, with coupling.
1—Gifford-Wood ice tacking machine, 7 cakes high.
1—Perfection "Special" ice scoring machine.
1—7½ h.p. low pressure blower.

JOHN F. CARSON
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BAldwin 9-8549

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KEHOE MONTHLY SPECIALS

2—7x7 high speed Worthington Comp.
2—8x8 high speed Carbondale Comp.
2—9x9 Fricks, ea. with 80 h.p. syn. motor 300 r.p.m.
3—sets of 10x10 duplex York or Frick, with 225 h.p. syn. motor 300 r.p.m.

ROBERT P. KEHOE MACHINERY CO., INC.
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Phone: TEaneck 7-3916

FOR SALE—Complete equipment for 20-ton ice manufacturing plant. Will sell separately. Almost new 50 lb. F & E ice cuber and U.S. deep well pump, 5 h.p. 2 York compressors with 25 h.p. motors. 1 Victor Acme air blower. 1 Westinghouse agitator. 240 freezing cans, 300 lbs. etc. Mounce Motors, Havana, Ill.

FOR SALE—Complete refrigeration unit. Worthington 7x7 vertical single acting compressor with 50 h.p. G.E. squirrel cage induction motor, 3 ph., 60 cyl. 220- 1750 High Torque open; Cutler Hammer starter, oil immersed; Panel board with high pressure switch; Stand by unit; used approximately 30 days. Washington Cooperative Fruit Growers, Inc., Washington, Va.

FOR SALE—ICE PLANTS & EQUIPMENT

10-30-50 ton ice plants
2—10x10 York ammonia compressors.
1—9x9 York ammonia compressor direct connected to a 75 h.p. synchronous motor.
1—8x8 York.
2—7½x7½ Yorks with 40 h.p. motors.
2—6½x6½ Yorks.
2—6x6 Fricks.

Self contained units, sizes 5 - 4 & 3 Yorks or Fricks. Motors and starters for all compressors. Condensers, brine coolers, cranes, can dumps, fillers, valves and fittings, etc.

Send us your requirements on any equipment needed.

B & E REFRIGERATION CO.
2 ORANGE ST., NEWARK 2, N. J.
Phone MItchell 3-7790

FOR SALE—ICE CANS. As a result of the sale of about half of the ice plants in our chain we have a surplus of both new and used ice cans and offer approximately 200 new 16 gauge Knickerbocker 11x22x44 low pressure cans F.O.B. Halls, Tenn., or Tupelo, Miss., for $8.63 each; about 150 new 11½x22½x44, 16 gauge Knickerbocker low pressure cans F.O.B. Tupelo, Miss., for $8.63 each; 100 new 11x22x47 high pressure 16 gauge Knickerbocker cans F.O.B. Dyersburg, Tenn., for $8.95 each; 400 used 11x22x47 high pressure 16 gauge Knickerbocker F.O.B. Dyersburg, Tenn., for $6.40 each; 200 used 11½x22½x44 low pressure 16 gauge Knickerbocker F.O.B. McKenzie, Tenn., for $6.40 each. The used cans are still in brine. All cans are subject to your prior inspection before purchase. Write or call Wilson Fly, Blue Star Service, Inc., 150 N. Tucker, Memphis, Tenn. Phone 36-6313.

FOR SALE—USED ICE PLANTS & REFRIGERATING EQUIPMENT

Complete Ice Plants 15-75 Ton
Ammonia Compressors, 3" x 3" to 12½" x 14½"
Condensers, Cranes, Blowers, coring Machines, Ice Canes—Various sizes.
Write or wire us on any equipment you may need.

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Cable Add.: ENEQCO Ph.: Yonkers 8-8118-9

Quick Results with I & R Classified Ads

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- *to Sell a Plant*
- *to Sell Used Equipment*
- *to Secure Help*
- *to Find a Job*

The classified section is the market place of the industry. Get fast action on equipment you want to buy or sell. Buyers are watching for equipment they can use. Convert idle equipment into cash. ICE AND REFRIGERATION classified rates *are low*—results *quick*.

Welded Cans
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

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Industrial Trucks and Trailers

THE OHIO GALVANIZING & MFG. CO.
NILES *Established 1902* OHIO

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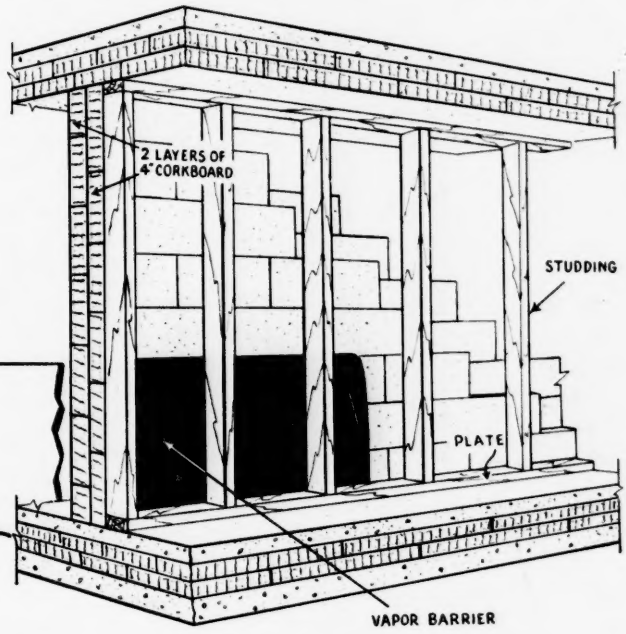
Wanted and For Sale Advertising 79

We have been asked:

How can we temporarily partition off freezer storage space?



A food wholesaler wrote to us recently and outlined this problem: "We are planning to build a large new freezer, actually larger than our present requirements. Can we partition off this room so that we need refrigerate only part of it, until such time as we need all the space?"

To answer this question, we sent the following suggestion: To avoid the needless expense of maintaining unused refrigerated space, part of the cold room can be temporarily sealed off with a wall of Armstrong's Corkboard. Then, when additional business volume creates the need for more cold space, this temporary wall can be removed.

A typical construction method is shown here. The temporary partition is built of two 4" layers of Armstrong's Corkboard and supported by 2" x 4" studs on the warm side of the wall. The layers are put up dry, so that the corkboard can be taken down and used again. The first layer of corkboard is firmly nailed to the studs over a vapor barrier of roofing felt. The second layer is then secured to the first by means of wood skewers. The cork on the cold side of the partition can be left bare or finished with a thin brushed-on coat of asphalt emulsion if desired.

Next time you have a job which calls for insulation, consider the many advantages of Armstrong's Corkboard. This sturdy material offers maximum insulating efficiency – is quick and easy to install. It has exceptionally high moisture resistance . . . won't shrink, swell, or warp . . . is lightweight and fire resistant. Finishes bond securely to its surface.

In addition to furnishing top-quality materials, Armstrong can plan and install the entire job for you—save you time, trouble, and money. For further information about Armstrong's **complete** Insulation Service, contact your near-by Armstrong representative.

SEND US YOUR QUESTIONS: If you have any questions about insulating materials or their use in high- or low-temperature installations, please write us. We'll see that you get a prompt, practical answer. Just address your letter or post card to Armstrong Cork Company, 4505 Concord Street, Lancaster, Penna.

ARMSTRONG'S INDUSTRIAL INSULATIONS

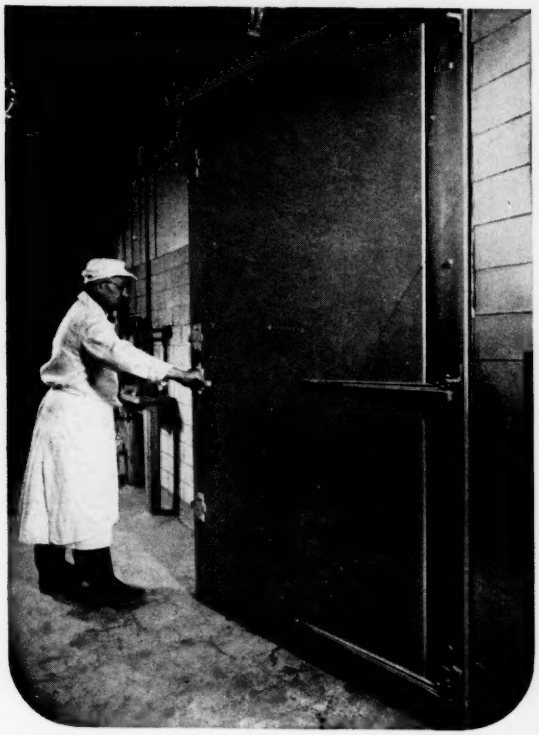
MATERIALS - INSTALLATION

FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.

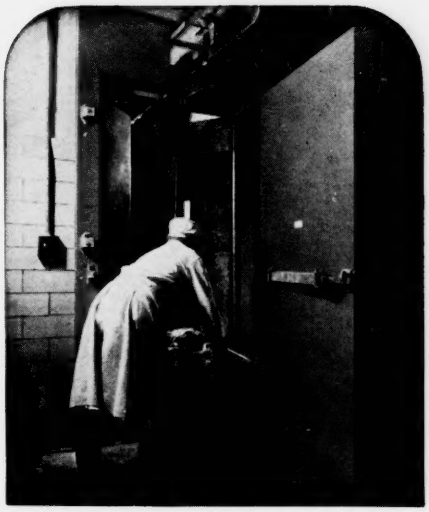
JAMISON
vestibule track doors

Speed handling— Save refrigeration

Series "50" Vestibule Track Doors with "Marine Quality" plastic bonded plywood, one piece front and rear panels, installed in the modern meat packing plant of Schulz Brothers & Company, Cincinnati, Ohio.



EASY TO OPEN — Door swings easily on ball bearing equipped Adjustoflex hinges.



VESTIBULE DOORS SWING OPEN—Free swinging double batten doors, close automatically to save refrigeration.

FAST MOVEMENT ON TRACK RAIL—Track port opens and closes automatically with door to permit movement of material on track rail. Compensator permits door to close without damage if there is any obstruction.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

For specifications and dimensions of this and other Jamison Series "50" Doors, request Catalog No. 3.
Jamison Cold Storage Door Company, Hagerstown, Maryland, U. S. A.